

This Week in The Iron Age

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The Iron Age

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AUGUST 29, 1940

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Blitzkrieg at Home

LITTLE JOHN LEWIS, the boy with the bushy eyebrows, is now sending up trial balloons. He is sounding out sentiment to determine where he and his cohorts can most safely and profitably throw their weight in the overdue public showdown on the coming armament program bog-down.

Mr. Lewis and one or two of his vociferous associates are leaving no stone unturned to characterize industrialists in the public mind as soulless ghouls who would sell this country to Hitler or any other bidder for a profit. He says that the mercenary employers of this country are deliberately delaying their duty in putting up new plants until they have exacted the last penny of potential profit. He virtually accuses industry, or rather the employers in industry, of adopting the same "slowdown" technique that he and his fellows of the C.I.O. found so effective in their abortive attempt to become labor dictators of America.

Now, of course, one might answer this assumption of a patent on patriotism by John and his fellow dues jugglers, by asking how many of the C.I.O. boys on the receiving end have given up their lucrative positions to volunteer for the army and navy that Uncle Sam is now building. We might even ask whether Mr. Hillman, in giving his services to the Administration, has done as Mr. Knudsen and Mr. Stettinius and others have in relinquishing salaries from their former business connections. And we might ask Mr. Lewis himself to state when and where he has ever "sprung to arms" in a cause of any kind except through remote control of the Herrin massacre. But we are not interested in entering a debate as to the respective patriotism of Americans in various walks of life. Ninety per cent of all of them, as belligerent John well knows, are good Americans.

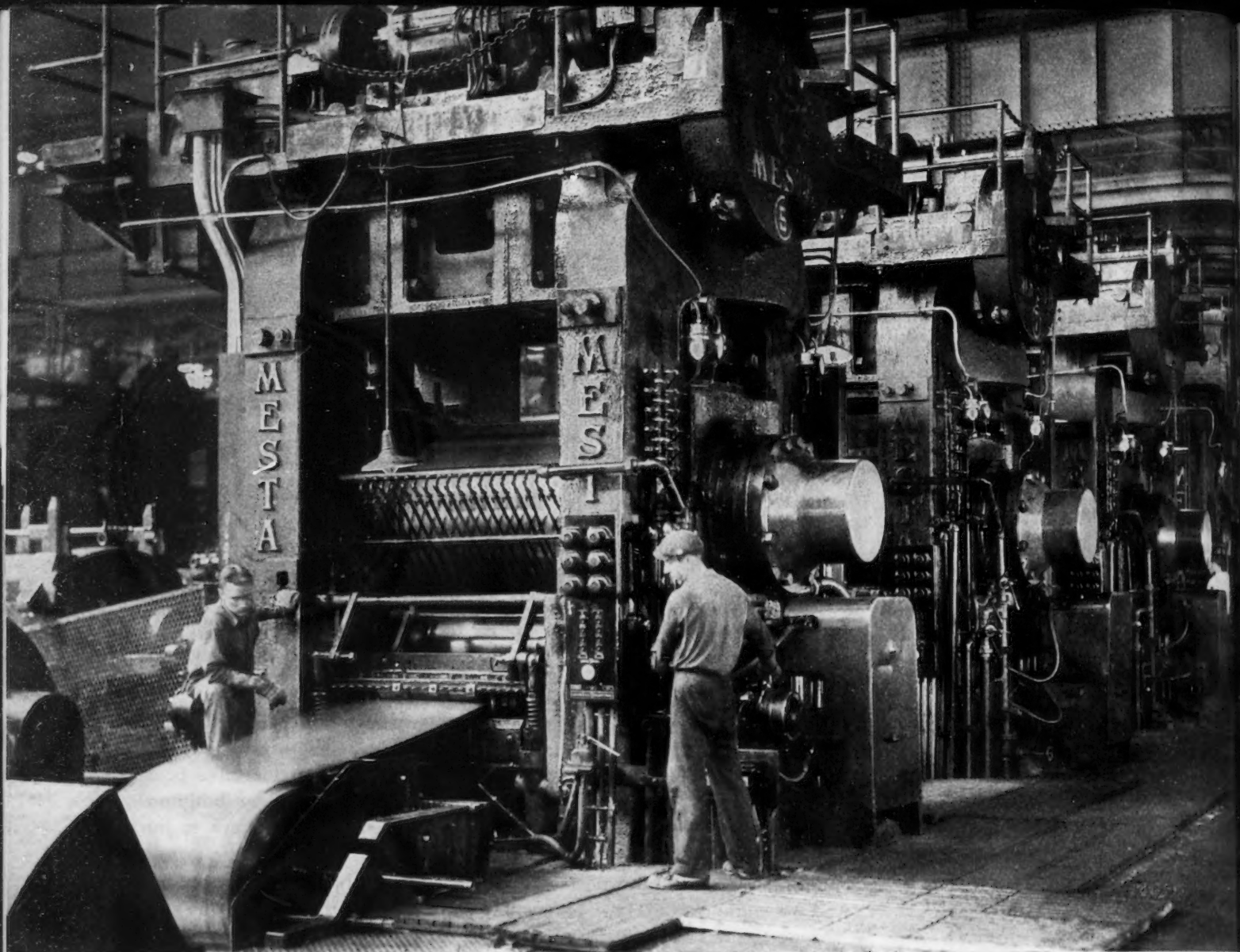
People who keep posted on the situation know that the armament program is bogging down. When the public finds this out, there is going to be "hell to pay" and plenty of hot pitch for the left wingers and friend John to use in trying to smear business men in Washington and at home.

John is too smart a boy to fail to realize why the program is bogging down. He knows what the difference is between a slowdown and a bogdown. But he may figure that he can buy more Administration support with half a million words against business than he got last time for the same number of dollars for the New Deal.

John knows from experience that a slowdown is a conspiracy to sabotage a project on the part of those charged with the duty of performance. And he knows that a bogdown, on the contrary, in this case is not the fault of the civilian performers but of those political higher-ups who have failed to provide a footing that will support that project.

Next week I will tell you where and why the armament project is bogging down.

J. W. Van Hook



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Spectrographic Analysis of Lead and Its Alloys

By J. N. MRGUDICH

*William Albert Noyes Laboratory of
Chemistry, University of
Illinois, Urbana,
Ill.*

THE applicability of the spectrographic method to the analysis of lead has long been known and its many advantages well recognized. These advantages have been enumerated so often and emphasized so strongly that there is a temptation to criticize the lead industry for even hesitating to advocate universal adoption.

Such criticism, however, would be unwarranted for the hesitation is not without real justification. The initial outlay for equipment, exclusive of space and dark-room facilities, is at a minimum about three thousand dollars. Contrary to popular belief, an adequately trained operator is essential for reliable data and a laboratory assistant after mastering mimeographed instructions left by the salesman cannot be considered as being adequately trained. Spectrographic methods, because of the relatively large amount of preliminary work required to fix excitation conditions, to prepare trustworthy standards and to develop a satisfactory photometric technic, are not likely to be in routine use for some time after installation of equipment. And, finally, spectrographic methods cannot, as a rule, be utilized economically unless at least 200 comparable samples are to be analyzed.

The three major disadvantages of initial cost, trained personnel and long developmental time are offset by the advantages of eventual tremendous speed, sensitivity far exceeding the majority of wet methods, certainty of qualitative identification requiring no confirmatory tests, completeness of qualitative identification which detects both

suspected and unsuspected constituents, satisfactory precision and accuracy in quantitative estimations, economy of sample, and permanent records of analyses.

Moreover, it should be pointed out that the spectrograph and its practically indispensable accessory, the photometer, are not necessarily limited to emission analysis. Absorption studies, measurements of reflectance and transmittance, evaluation of light sources and many other related fields of potential industrial significance are open to investigation by but slight modifications of the basic spectrographic equipment.

It must be admitted, however, that an industrial concern contemplating installation of spectrographic equipment faces a rather difficult problem in properly evaluating these advantages and disadvantages in terms of its own analytical and research requirements. The cost of the apparatus alone constitutes a rather formidable risk. It is only after definite, concrete evidence assuring successful utilization is available that such a concern can venture safely into the spectrographic field.

In this article a detailed description is given of the procedure developed for the lead industry in the Noyes laboratory. This procedure has been tested on over 1000 samples, it has been adopted by three important consumers and its results are accepted by at least 11 suppliers. The author believes that it is reliable and valid.

It is hoped, obviously, that this article will be of some value in demonstrating the validity of spectrographic methods as applied to the analysis of lead and its alloys.

ABOUT two years ago, at the request of the Prest-O-Lite Storage Battery Corp., the Noyes laboratory became interested in the spectrographic analysis of pig lead used in the manufacture of storage battery oxide. The procedure developed has proved so satisfactory that at the present time routine examination is made of samples submitted by Prest-O-Lite, the USL Battery Corp., of Niagara Falls, N. Y., and the USL Battery Corp. of Oakland, Cal.

The ultimate objective of the spectrographic program involves an evaluation of the effect of each common pig lead or grid metal (antimonial lead) impurity in terms of battery production and performance. A successful realization of this objective will allow for the formulation of a set of raw material specifications consistent both with satisfactory performance and with economical purchase price. The availability of a reliable set of such specifications, taken in conjunction with the spectrographic method which allows for an extremely rapid test for compliance, is advantageous for several reasons. First, it eliminates detrimental impurities; second, it assures the presence in proper amounts of beneficial impurities; third, it gives to the purchasing agent a much broader working range; and, fourth, it allows the plant engineer to blend two or more raw materials, none of which alone could pass specifications.

Qualitative Analysis

Qualitative spectrographic analysis depends upon the experimentally established fact that when any metallic element is excited in an electric arc or spark, radiation is emitted and this radiation is characteristic of the element so excited. Under appropriate excitation the amount of characterizing radiation, even though the element be present in trace amounts only, is quite sufficient to sensitize a properly selected photographic emulsion.

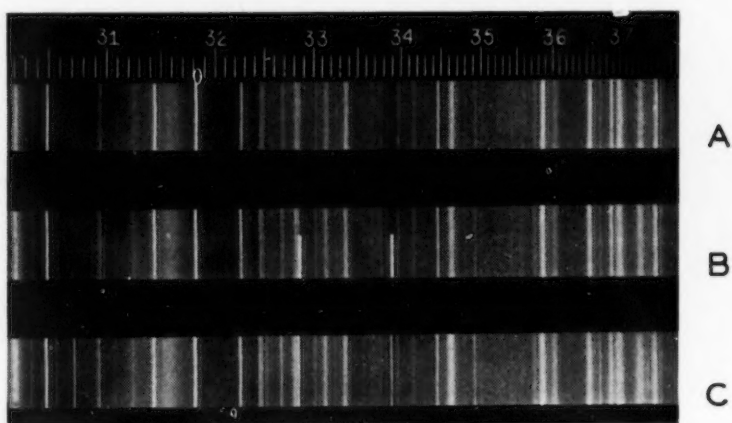
There is much that can be said in favor of the diffraction grating as the medium whereby the complex radiation of the source may be resolved into its constituent wave lengths as a series of sharply defined spectral lines, and undoubtedly in the future this will be the standard method of resolution. Usual present practice, however, and the one adopted by the author, employs a relatively large quartz prism. Fig. 1-A illustrates part of the pattern of lines, or spectrum, of 99.9999 per cent lead as registered on the medium

Bausch & Lomb quartz spectrograph. The superposed scale (reading in hundreds of Angstroms) gives a rough approximation (all scale readings are about 4 Angstroms high) to the wave length of each of the lines of the lead spectrum.

As perhaps may have been anticipated, qualitative spectrographic methods involve merely the correlation of the wave lengths of extraneous spectral lines with the elements giving rise to such lines. Such identification is simplified by the fact that there is associated with each element a series of three or four "persistent" lines, described as the last to disappear as the concentration of the element becomes progressively lower and lower. The observation of these persistent lines in the spectrum of an unknown may be

the iron spectrum on the plate to the iron spectrum on the chart. Visual observation as to the presence of persistent lines in the unknown is used to determine the elements constituting the unknown.

The method adopted for this research program is essentially a matching technic similar to that proposed by Pierce. The spectrum of lead (a constituent present in all unknowns) rather than iron is used as the matching spectrum and standard plates replace the projection chart. In Fig. 1-B will be found the qualitative standard for Ag. In this, a narrow spark spectrum of Ag is registered upon the edge of a wider spark spectrum of pure lead, using for this type of superposition a Hartmann "half-wedge." This half-wedge is cut so that the edge



taken as proof of the presence of the impurity element.

Any of several methods may be used for the identification of a suspected impurity line. Those involving a careful measurement of the wave length and subsequent reference to published wave length tables are, of course, the basic procedures. These are, for the most part, rather slow and tedious and, being in this respect somewhat impractical, will not be considered here.

Identification of Lines

Equally reliable and much faster methods involve a matching of unknown spectra with standard spectra. A technic recently described by Pierce¹ illustrates the simplicity of such matching methods. In this, the spectrum of iron is registered next to that of an unknown and the two spectra are projected upon a previously constructed chart giving the positions of the persistent lines of all spectrographically detectible elements arranged side by side with the lines of the iron spectrum. Precision enlargement and matching is made by adjustment of

common to Ag and Pb is directly in line with the optic axis of the spectrograph. Following the registration of the spark spectrum of an unknown, a simple edge-to-edge alinement of Pb lines of the Ag standard plate and the Pb lines on the unknown plate serves to determine the positions at which persistent and near-persistent Ag lines will be found if this element is present in the unknown. An illustration of this is given in Fig. 1-C, the spectrum of a typical Grade B pig lead. The persistent lines of Ag (at wave lengths of 3281 and 3383 Angstrom units) are clearly discernible in the Fig. 1-C spectrum. The 3248 copper line and the 3068 bismuth line are also visible in Fig. 1-C.

It has been found that about one day is required to register similar qualitative standards for 32 of the more common elements, the total material cost not exceeding five dollars. In use, the method is quite rapid since 16 unknown spectra can be examined for each of the 32 elements (a total of 512 qualitative tests) in about 30 min.

These same standard plates may be

¹ W. C. Pierce, O. Ramirez Torrez, and W. W. Marshall, *Ind. Eng. Chem., Anal. Ed.*, 11, 191 (1939).

used for the qualitative analysis of practically any type of non-ferrous material. The procedure consists merely in the superposition of the Pb spark spectrum upon that of the unknown and subsequent matching of this with the standard plates. The method is not satisfactory with complicated spectra since the resolving power of the medium-type instrument is not exceptionally high.

Spectrographic Sensitivity

Essentially only three factors determine spectrographic sensitivity: (1)

low ionization potential tends to depress the excitation of other elements. The third factor, excitation technique, has been considered recently by Owens,³ who presents a large amount of data showing the extreme sensitivity of various spectrographic methods. As a general rule, the limit of detection of most metallic elements is of the order of 0.0005 per cent.

In the specific case of lead, recent investigations⁴ indicate that the common impurities Cu and Ag may be detected at about 0.0001 per cent, Bi at 0.0003 per cent, Cd, Sn and Ni at

to the intensity of the impurity radiation at the source, i.e., to its percentage content in the sample.

Excitation Conditions

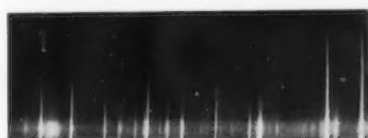
Since the magnitude of the photographic density of the spectral line of an impurity is the only index whereby percentage content may be estimated, a prime prerequisite of any satisfactory spectrographic method is that no variable but percentage composition enters to alter appreciably this density. It is necessary, therefore, that every precaution be taken to eliminate as far as possible all experimental excitation inconsistencies.

The most serious fluctuations originate in the erratic nature of the flow of current across the arc or spark. In the case of the arc, this is so marked that many operators report it necessary to continually adjust the arc gap during the actual exposure if even a roughly constant amperage is to be maintained. The arc has several advantages over the spark (economical installation, somewhat greater sensitivity, wider applicability, etc.) and seems to be preferred by many spectrographers. Also, it is the method tentatively adopted by the A.S.T.M. for the spectrographic analysis of pig lead, zinc and zinc alloys. For these reasons, serious attempts extending over a period of three months were made to use arc excitation in the routine examination of storage battery pig lead. Lack of control over excitation, however, forced an abandonment of the arc method and led to the adoption of the spark.

The power plant for the generation of the spark was made as simple as possible and consisted only of a resistance (passing 17.5 amp.) placed in the primary circuit of a 1000:1, 5-kw. transformer, actuated from a 220-volt a.c. line and a condenser of 0.0070 microfarads connected in parallel across the secondary. No added inductance was used in the secondary because it was found that its presence tended to concentrate the spark upon localized regions of the electrode, thus enhancing invalid sampling and electrode deformation. Such deformation, of course, is not conducive to rigorous experimental control, but seems to be inevitable with any type of excitation. It may be minimized and held rather constant if the flat ends of cylindrical electrodes 5/16 in. in diameter (2 in. long) are used as the actual sparking surfaces. The selection of a spark gap of 6.0 mm. was made upon the basis of minimum deformation. Under these conditions, there are evidently no pro-

OPPOSITE PAGE

FIG. 1—(A) Spectrum of 99.9999 per cent (6-9) lead. (B) Narrow spectrum of silver superposed upon a wider spectrum of 6-9 lead. Persistent silver lines are at 3281 and 3383. (C) Spectrum of Grade B pig lead showing presence of silver. Copper is indicated at 3248 and bismuth at 3068.



0.05 AG



0.01 AG

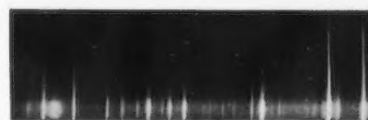


0.002 AG

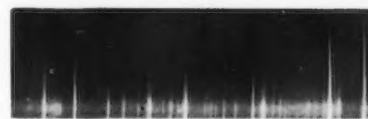
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RIGHT

FIG. 2—Log sector spectra of lead containing variable amounts of incorporated silver. The heights of the dotted silver lines (3281 and 3383) are proportional to their densities, but precise measurements of these heights are difficult.



0.0004 AG



6-9 PB

the nature of the element sought; (2) the composition of the sample under test; and (3) the type of excitation used to produce the spectra. The first two factors have been discussed in a clear and interesting manner by Harrison,² who points out the significance of low excitation and ionization potentials as determining the ease with which an atom may be caused to emit its characteristic spectrum. On this basis, as would be expected, the presence in the sample of appreciable amounts of an element of unusually

0.0005 per cent, Sb at 0.001 per cent, and As, Zn and Te at 0.01 per cent. Although there seem to be no recent data for analogous limits for such impurities as Ca, Mg, etc., there is every reason to believe that these would prove to be sufficiently low to satisfy all practical demands.

Quantitative Analysis

In qualitative spectrography the position or wave length of a spectral line is the factor of most importance since it is by this that the impurity is detected and identified. In quantitative analysis, on the other hand, the emphasis is shifted to the photographic density of the impurity line. It is this measurable density which is related

²G. R. Harrison, *Metals and Alloys*, 7, 290 (1936).

³J. S. Owens, *Ind. Eng. Chem., Anal. Ed.*, 11, 59 (1939).

⁴W. C. Pierce, O. Ramirez Torrez, and W. W. Marshall, *Ind. Eng. Chem., Anal. Ed.*, 12, 41 (1940).

nounced heating effects for, although the electrodes become warm during excitation, they are never so hot that they cannot be handled with the fingers.

A condensing lens usually placed between the source and the spectrograph to maintain a focus upon the slit was dispensed with, since intense illumination of the slit would necessitate shorter exposure times and, hence, aggravate the tendency for invalid sam-

Although Eastman ultraviolet sensitive plates were tried, the more common double-coated orthochromatic plate yielded equally satisfactory results. Precautions were taken to use only relatively fresh plates and any stock on hand was kept, especially during the warmer summer months, in a refrigerator. Plate processing was done originally in accordance with the Eastman D-7 procedure. This was replaced, however, by tank develop-

were made to shorten this plate processing procedure although it is presumably possible to have all these steps require but about 15 min.

Photographic Densities

Having fixed the above excitation procedure as one yielding reproducibility, attention was focused upon the selection of the most practicable method for evaluating line densities. Visual estimation, although sometimes used, was not considered sufficiently sensitive to small variations. The use of a recording, Moll-type microphotometer available in the laboratory has a serious disadvantage in that it involves the expenditure of a considerable amount of time, not only in the actual registration of plate traces, but also in the preliminary adjustment of the various delicate settings of plate light, focusing lenses, thermopile and galvanometer. Attempts were also made to use a logarithmic sector method for evaluating line densities. As illustrated in Fig. 2, this method results in a spectrum, the heights of whose lines are measures of their densities. Although the procedure is very simple, and hence attractive from a commercial standpoint, it has been found necessary to consider it as lacking in sensitivity to small changes in impurity content, being in this respect not much superior to the visual method.

The Gaertner visual microdensitometer⁵ was found to be the most satisfactory instrument available. Its advantages include a relatively low cost, ease of adjustment, direct estimation of both low and high density, simplicity of design and rigidity of construction. It is not without disadvantages. Being a visual instrument whereby the unknown density is matched against the known densities of a continuous Eastman wedge, a certain amount of eyestrain and fatigue follows prolonged use. This can be minimized by working in a darkened room and by interposing a red filter in the main light beam. Plate graininess is eliminated to a certain extent by grain plates incorporated into the two light paths, but this effect is still somewhat bothersome. Finally some practice is necessary before the matchings may be considered as reliable. The scale (0-100 divisions) is linear with respect to photographic density (0-4 units), a simple division of an observed scale reading by 25 serving to give density. Under ideal conditions scale readings are reproducible to within 0.25 divisions (corresponding to an error of 0.01 density units).

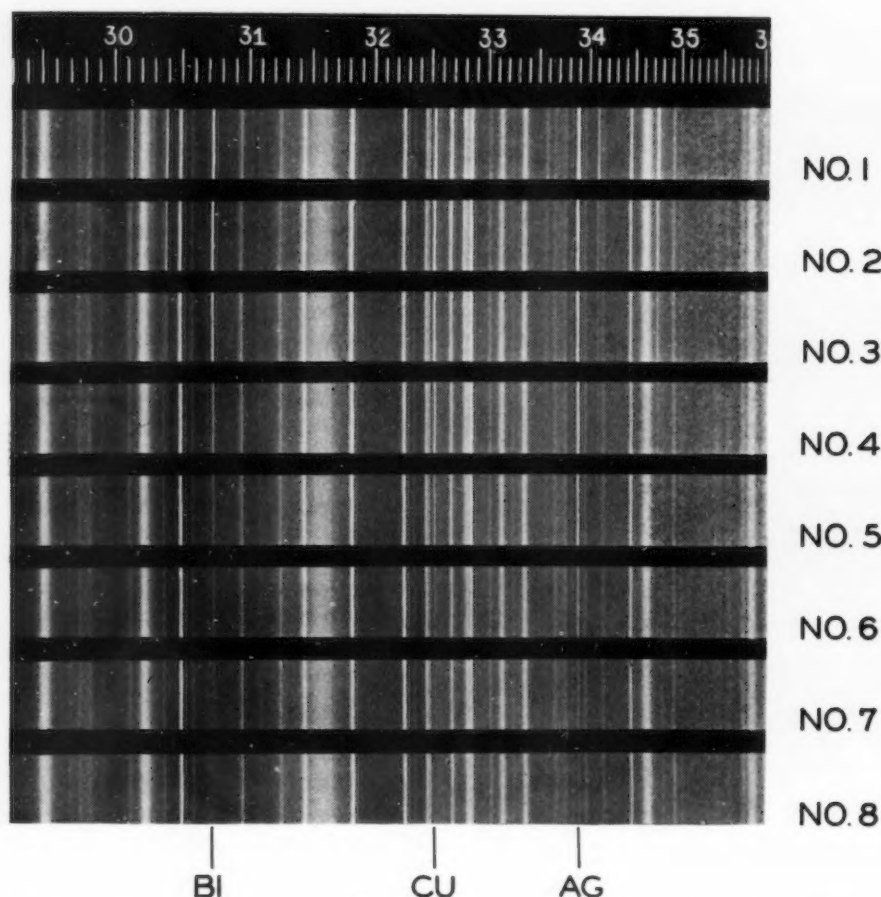


FIG. 3—Spectra of a series of standard samples showing fading of Ag (3383), Cu (3248) and Bi (3068) lines as concentration decreases. Concentrations are in the order 0.1, 0.05, 0.025, 0.012, 0.006, 0.003, 0.0016, 0.0008 per cent, except in the case of Cu where the lowest value is 0.0001 per cent. Uniformity of densities of lines of the Pb spectrum indicates constancy of excitation.

pling. Furthermore, without the condensing lens, a momentary wandering of the spark will not result, as it might if a focus were involved, in non-illumination of the slit. For reasons to be mentioned later, a slit width of 60 microns was adopted for all of the work. Before opening the shutter and starting the 2-min. exposure each pair of electrodes was given a preliminary sparking of one minute in order to remove superficial contaminations accumulated during handling.

⁵S. Jacobsohn and W. H. Kliever, J.O.S.A., 25, 244 (1933).

ment using Eastman standard X-ray developer and fixer. The greater stability of the X-ray solutions made it possible to work with these in 5-gal. batches, renewal being necessary about once every two months as compared to the daily or weekly renewal usually associated with other processing techniques. Development time was adjusted to the temperature of the developer. After development, the plate was fixed for about 15 min., washed in running water for about an hour, swabbed with moistened cotton, rinsed in distilled water, and dried in air. No attempts

approximately 1 min. being required for each estimation. The densitometer tube is so constructed that a 60-micron slit must be used during the original exposure if the spectral line under investigation is to fill completely the matching field.

Preparation of Samples

Perhaps the greatest difficulty in the adoption of a spark method for the spectrographic examination of pig lead resides in the fact that known amounts of added impurities must be incorporated homogeneously into solid lead electrodes. Attempts to dodge this task by using easily synthesized standard solutions or powders obtained from such solutions were abandoned when it was found that reproducible excitation could not be realized. Even if constancy could have been obtained, the adoption of a solution or powder method would have been made only with hesitation for it involves a time-consuming comparable solution of every unknown to be analyzed. The availability of satisfactory solid standards simplifies subsequent analysis in that unknowns need merely to be cast in the shape of the standards.

Several procedures were devised and tried for the homogeneous incorporation of known amounts of impurities into known amounts of pure lead. The one finally adopted is a modified D. M. Smith technic.^a

^aD. M. Smith, *Metallurgical Analysis by the Spectrograph*, p. 39, Clay & Sons, Bungay, Suffolk (1933).

A weighted amount of 6-9 (99.9999 per cent pure) lead is placed into a Pyrex test tube. After evacuation with a Hy-Vac pump the tube is gently heated until the lead is just molten and the temperature held at this point for about 10 min. in order to remove adsorbed gases contributing subsequently to excessive dross formation. After cooling and solidification the vacuum is broken and a weighed quantity of the impurity element (as a pure metal) is added. The contents are again melted *in vacuo*, shaking being continued until there is no indication of free lumps of impurity metal. The mass is allowed to cool, the vacuum broken, the second impurity metal added and the preliminary incorporation process repeated. Other constituents are added in a similar manner, each being introduced separately in order to facilitate observation of proper assimilation. The order of impurity addition should place first the metals which are incorporated with difficulty, such as Cu, while metals such as Ag and Cd are added last. A short preliminary trial will serve to determine the proper order associated with any particular set of constituents.

After all the impurities have thus been added, the metal bullet is removed and rolled (between clean steel rollers) into long, narrow strips about 1/32 in. thick. These are then cut into small pieces with clean shears, the pellets thoroughly mixed and remelted in a fresh test tube with shaking to enhance homogeneity. The pro-

cedure of melting, rolling, cutting, mixing and melting, is repeated three times and the final bullet cast into electrodes of the required shape. These electrodes constitute Standard No. 1.

Standard No. 2 is prepared by adding together equal weights of Standard No. 1 and 6-9 lead, the mixture being heated in a vacuum as before, shaken, cooled, rolled, cut, mixed and remelted, the procedure again being repeated three times. Other standards are prepared by further dilutions with 6-9 lead.

Testing for homogeneity of incorporation involves merely the spectrographic examination of several portions of the same standard. If these are found to be identical within experimental error, it may be assumed that homogeneity has been established. Such tests were made upon the majority of the standards and without exception it was found that uniformity had been realized.

The eight spectra of Fig. 3 correspond to a set of Ag, Mg, Bi, Cd and Sn standards, starting with No. 1 at 0.1 per cent of each incorporated impurity and progressing downwards to 0.0008 per cent, except in the case of Cu where the lowest limits is 0.0001 per cent.

Ed. Note:—Next week the author concludes with data dealing with the treatment of densitometric data, plotting working curves, reproducibility of data, accuracy of data, analytical data, etc.

Light Weight Flooring Joined by Welding

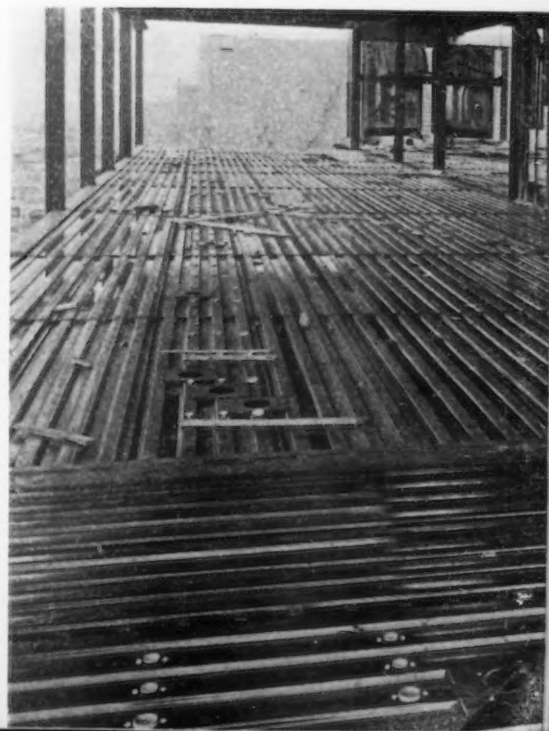
A NEW type of light weight steel flooring, resembling a series of connected channels with primary and secondary beams, proportioned to suit loading conditions and joined together and to the main structure by electric welding, has been developed by E. W. Burgess in cooperation with Worden-Allen Co., both of Milwaukee.

This new construction forms an integral, homogeneous deck construction, it is claimed, which adds to the strength and rigidity of the building and minimizes vibration. Use of this construction in a building recently erected in Milwaukee is shown in the accompanying illustration.

Deck plates serve as compression flanges for the primary beams and

since they are stiffer than flat steel plates in a direction parallel to the webs of the primary beams, they can be fabricated with stock as light as 3½ lb. per sq. ft.

Another advantage claimed is the elimination of temporary flooring. The permanent floor can be laid directly on the steel deck, thus shortening erection time to a considerable degree. On a recent project where this material was employed, the asphaltic concrete filler was used to a height 9/16 in. above the deck and linoleum was laid directly on the filler. Installation of service pipe and electrical ducts represents no difficulties, it is said. Plastering for ceilings is easily hung with wire from the secondary beams.



Billet Heating

**—New type of furnace is fired with
pulverized coal and employs com-
plete automatic control**

By C. F. HERINGTON
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IN the early part of last year the writer described in several articles printed in *THE IRON AGE* (Jan. 19, Feb. 2, April 20, 1939), modern pulverized systems, dwelling upon the advantages of pulverized coal firing in metallurgical furnaces as well as the many improvements made in the design of modern pulverized coal equipment and the subsequent increase in its efficiency, as compared with early methods.

An economical system of pneumatically transporting pulverized coal to furnaces or groups of furnaces in plants covering a large acreage and where a central pulverized coal plant served all of the heating operations, was also described.

The following article deals with a very modern improvement, made for Simmons Co., Kenosha, Wis., in the application of pulverized coal and the re-design of a heating furnace for that fuel. The conversion of the entire operation of a furnace to a precision heating machine by the adoption of automatic temperature, fuel air ratio, furnace pressure and automatic control of coal feed and fineness, is an outstanding achievement with pulverized fuel.

The dependability of pulverized coal as a major industrial fuel for many new purposes is now an established fact. At a time when by-product fuel

is not available to the non-integrated manufacturer, this is an important contribution in support of his competitive position. Coal is a basic commodity which is always available at a good competitive price. Now its use has features as attractive as gaseous fuels, and in certain locations pulverized coal is more economical and dependable.

The equipment described herewith includes a Raymond bowl pulverizer, shown in Fig. 1, as a direct connected unit together with the exhaustor and three riffles, which first divides the primary air and pulverized coal from the exhaustor into two streams and then divides each of these two streams into two more streams. Welded steel pipes lead to four cast iron Y's which connect to four cast iron improved AMCO fish tail type burners. A secondary air pipe is employed to furnish the correct mixture in the burner, and projects the mixture of air and fuel into the furnace at a comparatively high velocity. (Figs. 1 and 2). It should be noted that only the burner carries a combustible mixture; therefore, the probability of danger from explosion is less than with gas.

Furnace Design

The newly designed furnace has many new features not used in ordinary practice. It was built to re-

place an old furnace which had been in use for about 20 years. Originally this furnace was stoker fired but later used pulverized coal.

The overall length of the furnace was reduced some 6 ft. in the new design, with the pulverized coal combustion chamber being placed in position over the steel instead of in an extension at the discharge end of the furnace. Waste gases are removed at each end of the hearth, and the final heating of the steel is accomplished by diffusion through a protective layer of waste gases moving with the steel. The roof of the furnaces was raised some 3 ft., whereby direct heating of the steel, and therefore inequality of heating are avoided. Flues of adequate size to collect any dust deposits prevent interference with the normal operation.

Potential users of pulverized coal fuel or producer gas for continuous furnaces will find in this interesting improvement features worthy of close examination. A better result, or rather a new one with a desired degree of safe heating, is obtained by extreme simplification rather than complications.

The design provides four streams of gases moving from a single bank of burners located at one end of the furnace, the streams being parted from the main body of combustible at the center of the furnace and mov-

ing toward each end of the hearth above and below the steel.

An unusual feature of this new installation was the short period required for construction. Starting May 31, while the furnace walls were hot, all the old equipment including the complete furnace, steelwork, pulverizers, coal handling equipment, and coal bin were completely demolished and scrapped. On Sunday, June 2, dynamiters were employed to raze the solid concrete foundations, some 7 ft. deep, and enlarge spaces for the new waste gas flues. On Monday night, bricklayers were put to work and the steel workers, by the following Thursday, were erecting the steel plate casing and buckstays in place for the walls. Within 10 days, or Sunday night, June 16, at 6.20 p. m., after drying the furnace with wood fires for 42 hr., the pulverizer was started and in 20 min. had a charge of rails heated. On Monday morning, June 17, regular rail rolling operations were started and have been proceeding without interruption to date (July 19, 1940).

Former practice on the old furnace and pulverizers was as follows:

- (1) Start heating the furnace at 6:30 a.m.
- (2) Begin rolling rails at 7:30 a.m.

Today, with the new furnace, and automatic controls, the following schedule is being used:

At 6.50 a. m. city gas pilot burners are lighted. At 7.00 a. m. the coal pulverizer is started, and coal is fed to the furnace where it ignites immediately.

TIME	TEMPERATURE RECORDINGS
7:00 a.m.	1000 deg. F.
7:15 a.m.	1800 deg. F.
7:25 a.m.	2200 deg. F. (start rolling)
(35 min. = time saved in starting due to better coal pulverization, burners and combustion).	

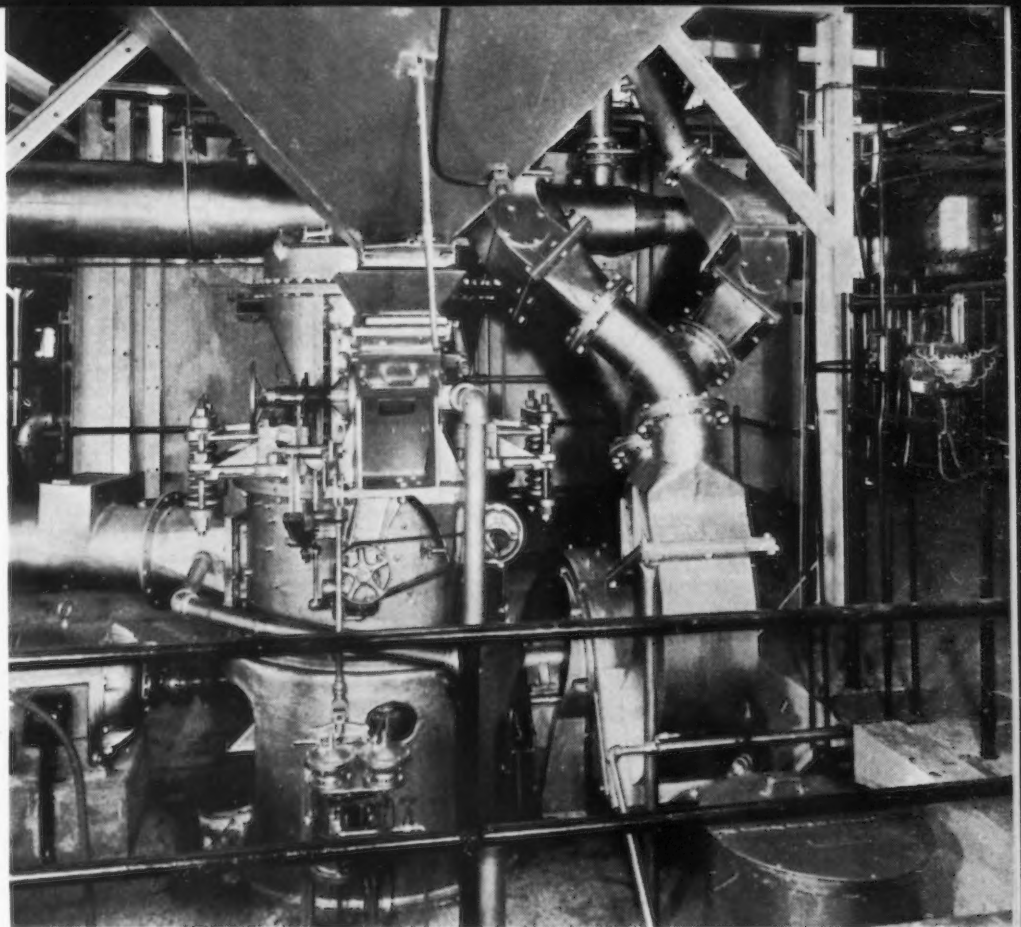


FIG. 1—Front view of Raymond bowl pulverizer. ° ° °

The recorded temperature on the chart is the average of two Ray-O-Tubes; one tube is located at a point 9 ft. from front wall of furnace and below the skid level. The higher temperature is taken at a point directly opposite in the furnace but above the skid level. The low temperature couple registers 200 deg. F. lower than the average and the other 200 deg. higher.

The furnace, operating at maximum speed of mill, delivers about 120 tons of 15-ft. (350-lb.) rails per 7½-hr. day. The fuel consumption is ap-

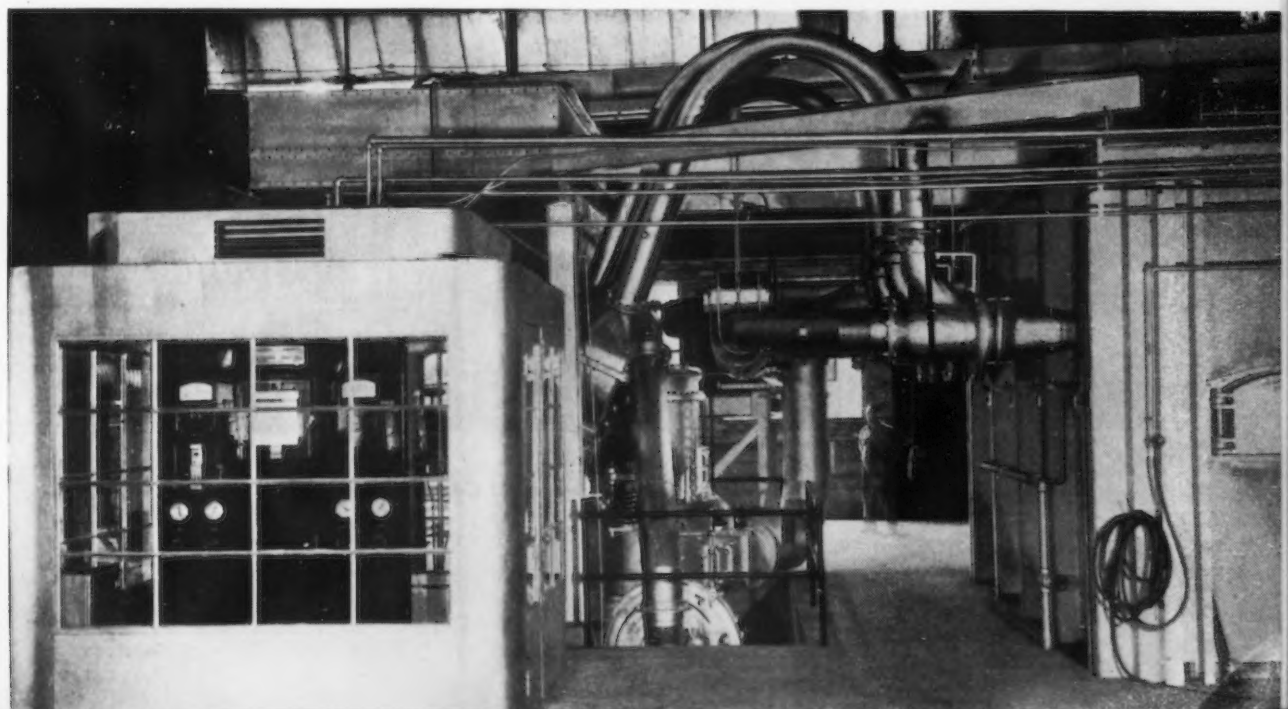
proximately 210 lb. of coal per ton of steel heated. This makes an average of 16 tons per hr., there being from 75 to 80 rails in the furnace at all times.

With the old furnace using two beater type pulverizers, each being divided by a flap valve into two round burners inserted into the furnace 4-ft. above the floor—and with pulverized coal having a fineness of never more than 75 per cent through a 200 mesh screen—the fuel consumption was approximately 340 lb. of coal per ton of steel. The present fuel saving is

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FIG. 2—Furnace burners and automatic control panel in enclosure.

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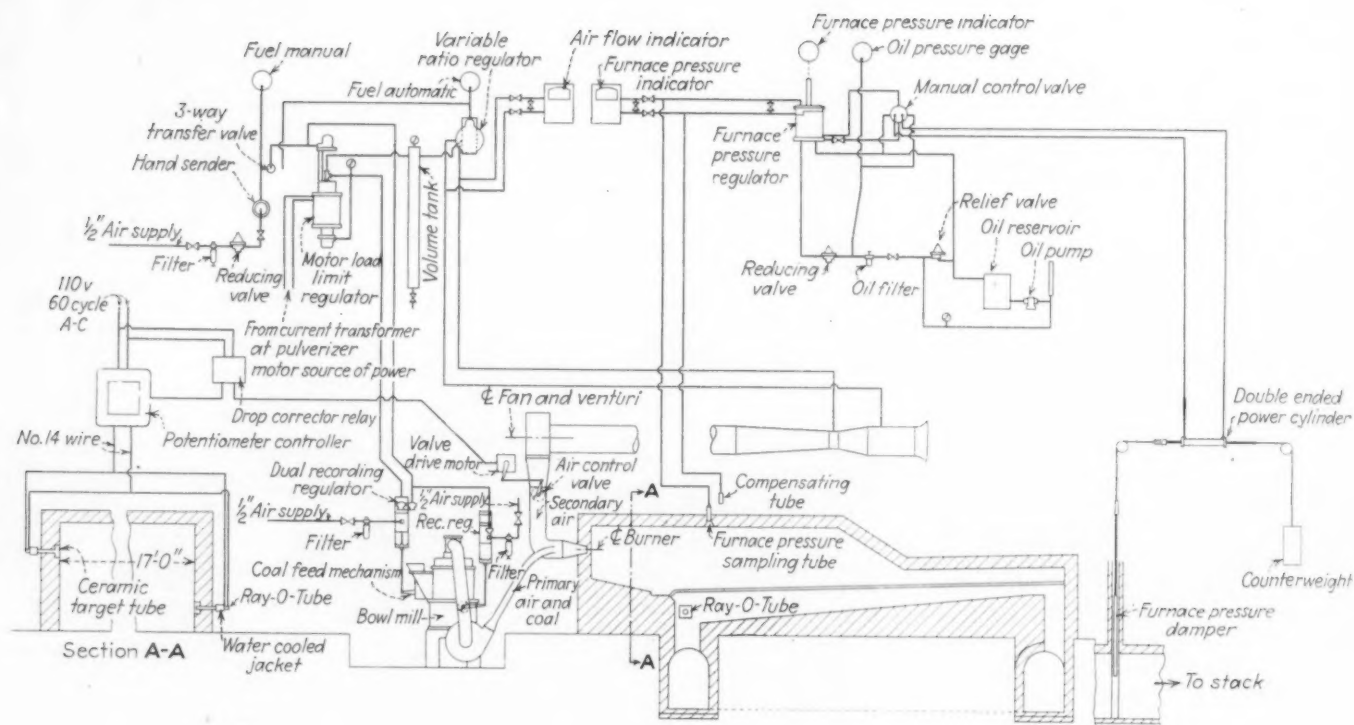


FIG. 3—Section of furnace and general arrangement of the automatic controls.

130 lb. of coal per ton of steel heated and would be considerably greater if the mill was equal in capacity to the new furnace.

Present coal fineness from the bowl pulverizer is 99.9 per cent through a 50-mesh screen and 90.1 per cent through a 200-mesh screen. The new high velocity burners and the design

of the furnace result in a recirculation of the hot gases in a manner not previously employed in continuous heating furnace design and sweating or washing of the steel is eliminated.

Automatic Controls

A diagrammatic drawing is shown in Fig. 3 which shows the general ar-

rangement of the automatic controls. The automatic control system will operate by using an inlet measuring element such as a Venturi tube, through which the secondary air necessary to complete combustion passes. A temperature controlled power unit actuates a regulating valve to measure the air flow in accordance with the

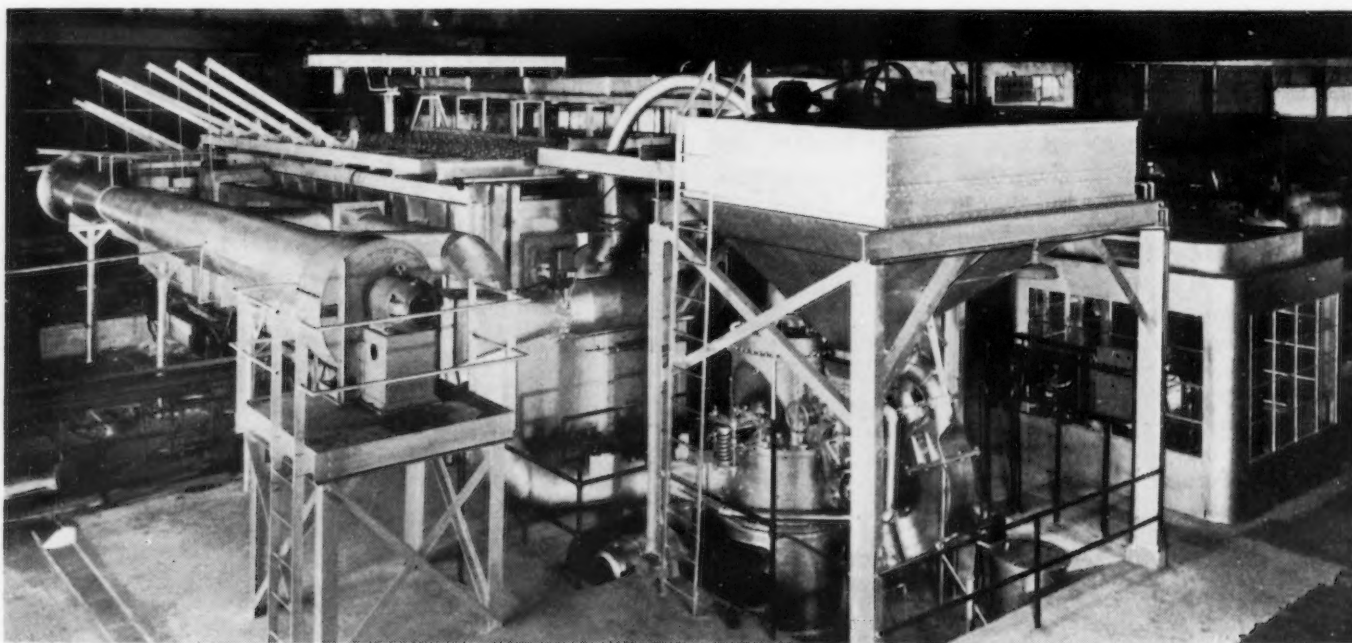


FIG. 4—West side of furnace.

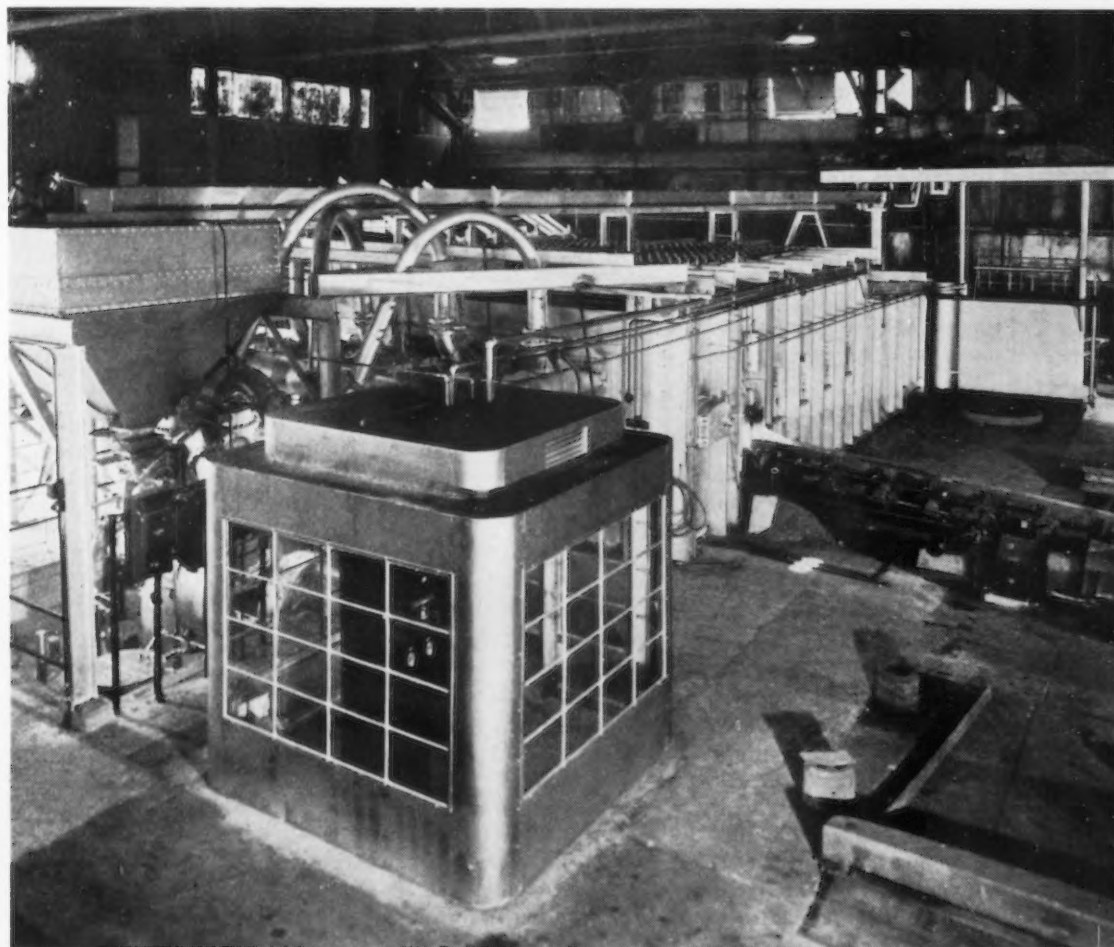
furnace requirements. An air-fuel ratio regulator connected across a Venturi tube measures the air flow and generates a loading pressure, varying from 0 to 50 lb. per sq. in., in accordance with the actual quantity of air supplied. This loading impulse is transmitted to two receiving type power cylinders, one connected to the mill exhaust fan inlet damper control and the other to the coal feeder drive control of the pulverizer. These

measures the actual load on the pulverizer driving motor and generates a loading impulse pressure which is transmitted to the second bellows unit of the dual feeder driving control. With the Raymond bowl pulverizer there is a definite amount of coal within the mill for any firing rate and fineness. Hence there is a definite load on the mill driving motor. The mill charge collector measures this load and re-adjusts the feeder drive control unit

furnace together with the Venturi tube and suction inlet pipe to the secondary air blower, which is mounted on a structural steel platform. At the end of the discharge extension pipe may be seen the air control valve and mechanism.

Fig. 5 shows the east side of the furnace together with the steel plate and glass enclosure to house the automatic control panel board. In the background may be seen the pressure

FIG. 5 — East side of furnace.



two receiving type power cylinders assume definite positions in accordance with the loading pressure, and the proper relations between primary air and fuel feed are maintained constant in any adjusted position.

The coal feeder drive control operates a lever on the pulverizer, to deliver a variable stroke to actuate a revolving slot feeder. This control is of the dual acting type having two receiving bellows, which move the power cylinder in the desired direction; one is connected to the air-fuel ratio regulator and the other to a mill charge corrector. The mill charge corrector

whenever necessary to maintain the desired conditions. With this arrangement inaccuracies in the feeder mechanisms which might result from varying sizes of coal fed or from other factors are automatically compensated.

The control of furnace pressure is accomplished in the usual manner by an oil pressure power cylinder operating a water cooled slide damper in the waste gas flue, whereby heating conditions and furnace atmosphere remain constant.

Fig. 4 shows the west side of the

control slide damper with the water cooling pipes and counterweight cylinder.

The switchboard directly behind the enclosure is for starting the pulverizer, coal feeder, secondary air blower, and oil pump. The electrical connections are made interlocking, thus making it impossible to feed coal into the pulverizer unless the pulverizer motor has first been started.

These pictures were taken immediately after the noon shut-down period, there being no additional effort made to clean the surroundings.

General Purpose Nickel-

A POSSIBLE answer to the non-ferrous foundryman's plea for an alloy amenable to simple heat treating practice, yet whose physical characteristics may easily be adjusted to a wide range of specification requirements, is the nickel-bronze age-hardenable alloy described herein. Melting, casting and heat treatment procedures are discussed and comparisons are made with gun metal, high-tensile brass and phosphor-bronze. This report is based on a paper read by the author before the Scottish Chapter of (British) Institute of Metals and originally published in Foundry Trade Journal.

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THE number of non-ferrous casting alloys used in engineering is extremely large. While many of these alloys are basically similar, differing only in some minor detail, there are also included alloys which are of distinct types, each type requiring a different technique and often a specialized knowledge.

The necessity for constant variation in procedure to meet the different mechanical specifications of the many alloys a foundry is required to handle is highly inefficient, and militates against the regular production of castings of uniformly good quality. Any development which, while still allowing the different mechanical specifications to be met, at the same time would reduce the number of alloys to be handled in the foundry, should be very welcome.

The casting alloys which are discussed herein are those in which copper is the predominant element. It is unlikely that there will be developed an alloy of this type which, in the as-cast condition, will have such mechanical properties that it could successfully meet a very wide range of specifications. However, the development of alloys suitable for sand casting which are susceptible to heat treatment has made available material which, by suitable modification of a simple heat treatment, has a much enlarged range of properties.

In 1928 Price, Grant and Phillips¹ reported that certain alloys of Cu, Ni and Sn were capable of being hardened

by ageing. In 1934 Wise and Eash² reported further data on this phenomenon, their work being confined to bronze alloys containing up to 15 per cent Sn and 20 per cent Ni. Further contributions to this subject have been made by Fetz,³ Eash and Upthegrove,⁴ and by Veszelka.⁵ More recently data have been published by Kihlgren,⁶ who confined his work to one alloy containing 88 per cent Cu, 5 per cent Sn, 5 per cent Ni, and 2 per cent Zn.

Herein, it is intended to give the results obtained by the author when using the 88:5:5:2 nickel-bronze alloy, and to compare these results with the mechanical properties of three popular and typical non-ferrous casting alloys, Admiralty gunmetal, phosphor-bronze and high-tensile brass.

Heat Treatment

Some idea of the range of properties capable of being obtained in the 88:5:5:2 nickel-bronze is shown by the fact that its Brinell hardness can be varied between 80 and 200 by suitably adjusting the heat treatment. For the best properties to be obtained, the 88:5:5:2 nickel-bronze, like most age-hardenable alloys, is subjected to a double heat treatment. The first part consists of heating at a high temperature, followed by rapid cooling, such a treatment producing maximum softness, and, for the second part, reheating or ageing at a much lower temperature. Of the two sections of the heat treatment the second is the more critical, since varying the time and

temperature at this stage results in a wide variation in mechanical properties.

Table I shows the effect on hardness of varying the heat treatment. While the alloy responds so well to heat treatment, it nevertheless has excellent mechanical properties in the "as-cast" condition. Typical as-cast figures are given in Table II, together with figures for Admiralty gunmetal. It will be noticed that the superiority of the Izod impact value is marked.

Mechanical properties of the nickel-bronze after heat treatment, as compared with high-tensile brass and phosphor-bronze, are given in Table III. The values given for the sample of phosphor-bronze are higher than the usual run. The actual test piece used was taken from the bottom of a large casting, the high metal pressure and annealing effect of the large mass accounting for the above average results.

It will be noted that in all these conditions of heat treatment the limit of proportionality and the yield point of the nickel-bronze are superior to those values for the phosphor-bronze and the high-tensile brass. The Izod impact of 36 ft-lb. obtained in the material aged at 480 deg. F. is considerably in excess of even the high-tensile brass.

Ageing at 570 deg. F. gives an excellent balance of properties, an Izod impact value equal to the high-tensile brass, a limit of proportionality $2\frac{1}{2}$ times greater and a yield point $1\frac{1}{2}$ times this alloy.

Although the elongation has been reduced to 5 per cent on ageing at 66 deg. F., the impact value is not dangerously low. As a matter of fact, the Izod value of 11 ft-lb. is as good as that obtained in the phosphor-bronze, and, while being lower than the value already given for the Admiralty gunmetal, is as good as many samples of Admiralty gunmetal which the author has examined.

Bronze Alloy

By A. DUNLOP

The manufacture of castings in the nickel-bronze alloy presents no greater difficulties than are encountered when Admiralty gunmetal is used. Like any other alloy, it is not absolutely fool-proof, and under certain circumstances the best results may not be obtained. As pointed out by Kihlgren,⁶ if the maximum response to heat treatment is to be obtained, contamination by lead must be guarded against; 0.05 per cent of this element has been shown adversely to affect the response to heat treatment. In selecting raw materials, care should be taken to use metal which is sufficiently low in lead.

The nickel may be added as pure nickel or as 50:50 copper-nickel shot. When the alloy is to be used in the as-cast condition, lead is no more detrimental than it is in Admiralty gunmetal.

Failure of the alloy to give the maximum response to heat treatment can also arise if either the tin or nickel contents become too low or if the material is unsound.

One of the main causes of unsoundness in sand castings in alloys of this type is unsatisfactory melting technique.

To obtain best results, it is advisable to melt these alloys in a slightly oxidizing atmosphere.

Successful results have been obtained with the nickel-bronze in crucible furnaces which have been coke fired, using natural draught, forced draught using oil, and forced draught using town gas. It has been found that the simplest way to ensure a slightly oxidizing atmosphere in the above types of furnace is to use flux which is slightly oxidizing in character. Manganese ore has been found to be very suitable for this purpose, but copper oxide can also be used. There are also on the market certain proprietary fluxes which can be recommended for the purpose.

Satisfactory results can be obtained by using virgin metals, but it is prob-

ably the best practice, although not absolutely essential, to ingot the virgin metals before use. Melts consisting partly of ingoted new metal and partly of remelted metal, such as runners and risers, are also satisfactory, and excellent results have been obtained on using 100 per cent remelt.

In making a melt from new metal, 2 per cent of the weight of the charge of manganese ore is placed in the bottom of the crucible, followed by the nickel and the copper. When this is melted, and at about 2280 deg. F., the flux is skimmed off. If the flux is too fluid, it may be thickened by adding some dry sand, or preferably lime. Following this the zinc is added and then the tin. Immediately before pouring, an addition of 0.05 per cent phosphorus added as phosphor-copper is beneficial. A casting temperature in the range 2120 to 2230 deg. F. is suitable for most types of casting.

When 100 per cent remelt is used for the charge, as before, 2 per cent of manganese ore is placed in the bottom of the crucible, followed by the alloy. When hot enough the flux is removed, and before pouring 0.05 per cent phosphorus is added. It is beyond the scope of this paper to go into detail concerning methods of gating and running.

Most castings are a problem in themselves. This, of course, applies

to all casting alloys. However, it will be sufficient to state that gating and running practice found suitable for Admiralty gunmetal will in most cases be found satisfactory for the 88:5:5:2 alloy.

Risers do not need to be used so frequently or be of so generous a size as when high-tensile brass is used; neither is there anything like the same tendency as with high-tensile brass to form dross and consequently dirty castings.

The 88:5:5:2 alloy has a much smoother cast surface than that normally obtained with phosphor-bronze. This is of considerable importance in such castings as complicated impellers, which, because of their design, are difficult to dress.

Pressure-Tightness

It has already been shown that from the point of view of strength, the 88:5:5:2 alloy seems admirably suited for castings to withstand hydraulic pressure. However, strength alone is insufficient, pressure-tightness being also essential for such applications as valve parts.

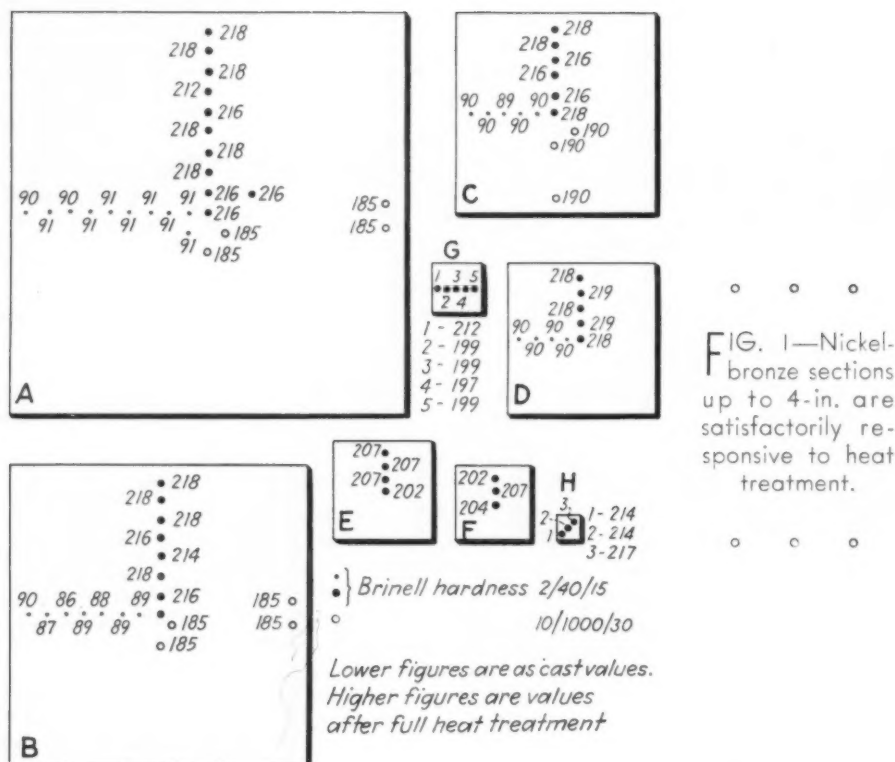
No difficulty has been experienced in producing castings in the 88:5:5:2 alloy which are pressure-tight. Castings of section as thin as $\frac{1}{4}$ in. have successfully withstood internal water pressure of as high as 1000 lb. per sq. in.

The view has been expressed that annealing Admiralty gunmetal impairs the pressure-tightness. Castings of the 88:5:5:2 alloy are quite pressure-tight in the as-cast condition, and it has been found that in the heat-treated condition the 88:5:5:2 alloy is capable of successfully withstanding considerable water pressure. The following may be taken as typical of the alloy.

A cylindrical sleeve casting was made of 3-in. length by $3\frac{3}{8}$ in. external diameter and $2\frac{3}{8}$ in. internal diameter, giving $\frac{5}{8}$ in. wall thickness. The casting was molded with the core

TABLE I
Effect of Varying Heat Treatment on Hardness of Nickel-Bronze Alloy

Heat Treatment	Brinell hardness 2/40/15
None, as-cast	84
5 hr. at 1400 deg. F., W. Q.	81
5 hr. at 1400 deg. F., W. Q. + 5 hr. at 480 deg. F., W. Q.	117
5 hr. at 1400 deg. F., W. Q. + 5 hr. at 570 deg. F., W. Q.	168
5 hr. at 1400 deg. F., W. Q. + 5 hr. at 660 deg. F., W. Q.	212
W. Q. = Water Quench.	



horizontal; the metal was introduced at one end by a downgate, the ingate being cut at the joint in the mold. In the as-cast condition this casting successfully withstood an internal water pressure of 1450 lb. per sq. in., the maximum pressure capable of being produced by the testing apparatus. Following this the casting was machined internally to give a wall thickness of $\frac{1}{2}$ in. The machined casting was still pressure-tight at 1450 lb. per sq. in. Thereupon the casting was heat-treated for 5 hr. at 1400 deg. F. and water quenched, followed by 5 hr. at 660 deg. F. Re-testing of the heat-treated casting showed it still to be pressure-tight at 1450 lb. per sq. in. Having successfully withstood this test, the section of the casting was reduced to $\frac{5}{16}$ in. by machining internally and externally, following which it was re-tested. The reduction of section did not in any way affect the pressure-tightness, the casting still being tight at 1450 lb. per sq. in.

It is generally recognized that the mechanical properties of test bars may not be representative of the actual strength of the castings produced. A small tensile test-piece of 0.178 in. diameter in the gage length was machined from a piece cut from the above casting after completing the pressure tests. The sample had the following mechanical properties: Brinell hardness (2/40/15), 190; yield, 58,000 lb. per sq. in.; tensile strength, 63,000 lb. per sq. in.; elongation on $4\sqrt{A}$, six.

The hardness, yield point, and elongation are as good as those values obtained on test-bars, but the tensile strength is a little lower. When it is remembered that these results were obtained on a bar 0.178 in. diameter, machined from the center of a $\frac{5}{8}$ -in. section of the sleeve casting, the results are quite good.

From experience gained on the response of carbon steel to heat treatment, it might be thought that diffi-

culty would be encountered in obtaining hardening throughout heavy sections of the nickel-bronze. As the following experiments will show, this is not the case, and sections of up to at least 4 in. can be successfully hardened by heat treatment.

Eight castings of the following dimensions were made: (a) $\frac{1}{4} \times \frac{1}{4} \times 6$ in.; (b) $\frac{1}{2} \times \frac{1}{2} \times 6$ in.; (c) $\frac{3}{4} \times \frac{3}{4} \times 6$ in.; (d) $1 \times 1 \times 6$ in.; (e) $1\frac{1}{2} \times 1\frac{1}{2} \times 6$ in.; (f) $2 \times 2 \times 6$ in.; (g) $3 \times 3 \times 6$ in.; and (h) $4 \times 4 \times 8$ in.

These blocks were molded with their longest dimensions in the vertical plane. Pieces were cut from the bottom of the four smallest castings to give $\frac{1}{4}$, $\frac{1}{2}$, $\frac{3}{4}$ and 1-in. cubes. Two slices were cut from the bottom of the four largest castings, each slice being half the thickness of the casting. The bottom faces of the four largest castings were polished and a Brinell hardness exploration made across the section. The two slices cut from each casting were then welded to form a cube in such a way that the bottom face of the casting became the inner face of the cube.

The eight cubes were heated for 5 hr. at 1400 deg. F., water quenched, followed by 5 hr. at 660 deg. F., and again water quenched. After heat treatment, the four smaller cubes were sectioned, while the four welded cubes were split at the welds. An exposed face from the center of each cube was polished and a Brinell hardness exploration was made across the section. In the case of the welded cubes, the faces polished were those which had already been explored for hardness in the as-cast condition.

Result of hardness exploration in each of the blocks is shown in Fig. 1. In the case of the four smaller cubes, only the full heat-treated values are given, since the cubes were not sectioned until the heat treatment was completed. The as-cast as well as the fully heat-treated hardness is given for the four larger cubes. It will be evident from these results that mass is not detrimental to the response to heat treatment. Sections at least up to 4 in. can be successfully treated.

Modification of Heat Treatment

While the heat treatment process, which has already been discussed, presents no great difficulty, some even simpler modifications have been developed. For many applications the maximum properties capable of being developed in the alloy are not required. Where this is so, the high temperature treatment can be dispensed with, the alloy being directly aged in the

TABLE II
As-cast Properties of Nickel-Bronze Compared with Admiralty Gunmetal

Alloy	Condition	Brinell Hardness 2/40/15	Proportional Limit, Lb. Per Sq. In.	Yield, $\frac{1}{2}$ Per Cent Elong. Under Load, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation in 2 In., Per Cent	Izod, Ft. Lb.
88:5:2 Nickel-bronze	as-cast	89	12,800	21,000	44,000	35	51
88:10:12 Admiralty gunmetal	as-cast	81	10,000	17,400	39,200	37	17

as-cast condition. For example, the following worth-while properties can be obtained by simply treating the as-cast nickel-bronze for 5 hr. at 660 deg. F.: Brinell hardness (2/40/15), 112; proportionality limit, 20,000 lb. per sq. in.; yield, $\frac{1}{2}$ per cent elongation under load, 28,400 lb. per sq. in.; tensile strength, 51,200 lb. per sq. in.; and elongation on 2 in., 30 per cent.

By this treatment the alloy is as hard as the phosphor-bronze, has a higher tensile strength, and about $1\frac{1}{2}$ times the limit of proportionality and the yield point.

While the strength of the alloy at 1400 deg. F. is adequate to permit of safe handling of most types of castings at that temperature, it is possible that, as a result of the shape or the size, or for some other reason, it would not be advisable to quench a particular casting from 1400 deg. F. Cooling in air from 1400 deg. F. followed by ageing at 660 deg. F. could easily be done. The rate of cooling of a casting in air depends on the mass and the section. To give some idea of what is likely to be obtained by air cooling from 1400 deg. F. castings of various section, the following experiment was conducted:

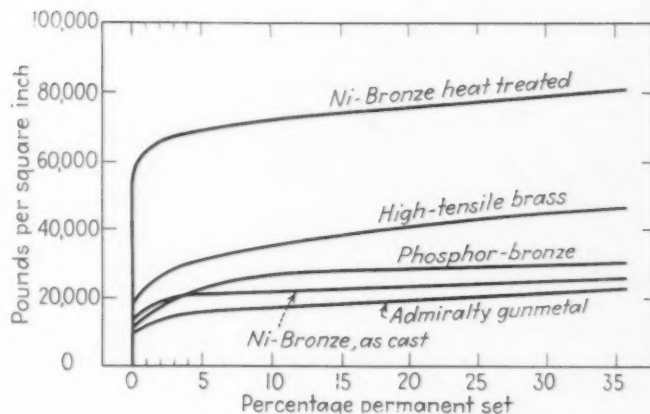
As a simple method of obtaining various rates of cooling from 1400 deg. F., seven nickel bars, varying in length from 6 to $1\frac{1}{2}$ in. and in diameter from 6 to $1\frac{1}{2}$ in., were obtained, and a hole drilled into the center of each. A loosely fitting nickel plug was made for each hole, the depth of the hole and the length of the plug being such that a $\frac{3}{8}$ -in. cube could be placed in the center of each block.

The blocks were heated to a temperature of 1400 deg. F. when a $\frac{3}{8}$ -in. cube of the 88:5:5:2 alloy was placed in each hole, followed by the appropriate nickel plug. After 5 hr. at 1400 deg. F., all the blocks were removed from the furnace and cooled in still air. At a later date the rate of cooling of each block was determined.

Following the cooling in the blocks, the $\frac{3}{8}$ -in. cubes were given a 5-hr. treatment at 660 deg. F. It was obvious from these results that a very useful degree of hardness, namely, 140 to 145 Brinell, can be obtained by moderately slow cooling from 1400 deg. F., followed by ageing.

While it may not be possible to handle some types of casting at 1400 deg. F., these castings could probably be handled safely at a lower temperature. With this in mind, a further modification in the heat treatment was developed. In this treatment the casting is given a certain time at 1400 deg.

FIG. 2—A load in excess of 54,000 lb. per sq. in. is required to produce permanent deformation in heat treated nickel-bronze.



F., cooled in the furnace to a lower temperature, and then quenched. Following this the usual ageing treatment is applied. The following is an example of the excellent results which can be obtained by this type of treatment: Treatment: 5 hr. at 1400 deg. F., furnace cooled to 1020 deg. F., water quenched, plus 5 hr. at 660 deg. F. Characteristics: Brinell hardness (2/40/15), 191; proportionality limit, 44,800 lb. per sq. in.; yield, $\frac{1}{2}$ per cent elongation under load, 60,000 lb. per sq. in.; tensile strength, 74,400 lb. per sq. in.; elongation on 2 in., 5 per cent; Izod, 9 ft-lb.

Bearing Characteristics

A necessary feature of any bearing alloy is the ability to resist deformation under compression. In the heat-treated condition the nickel-bronze is capable of withstanding extremely high loads under compression without suffering permanent deformation. Fig. 2 shows a series of curves which illustrate the behavior of the nickel-bronze alloy as-cast and after heat

treatment, as compared with Admiralty gunmetal, phosphor-bronze and high-tensile brass. The heat treatment applied in this case was 5 hr. at 1400 deg. F., water quenched, plus 5 hr. at 570 deg. F., water quenched. It will be noted that in the Admiralty gunmetal permanent deformation takes place when loads over 10,000 lb. per sq. in. are applied. This is raised to 12,000 lb. for the phosphor-bronze and 18,000 lb. for the high-tensile brass. In the as-cast condition the nickel-bronze requires a load greater than 14,000 lb. per sq. in. to produce permanent deformation, and this is raised to the high figure of 54,000 lb. per sq. in. when the alloy is heat-treated.

The actual assessing of the bearing characteristics of an alloy is not too easy. Laboratory tests may give an indication of how an alloy is likely to behave, but the actual quantitative value obtained only holds good for the conditions under which the tests are conducted. The real test of an alloy's suitability for a particular ap-

TABLE III
Properties of Heat Treated Nickel-Bronze Compared with Phosphor-Bronze and High-Tensile Brass

Alloy	Condition	Brinell Hardness, 3/40/15	Proportional Limit, Lb. Per Sq. In.	Yield, $\frac{1}{2}$ Per Cent Elong. Under Load, Lb. Per Sq. In.	Tensile Strength, Lb. Per Sq. In.	Elongation In 2 In., Per Cent	Izod, Ft. Lb.
88:5:5:2 nickel-bronze	5 hr. 1400 deg. F., W.Q. +						
	5 hr. 480 deg. F., W.Q.	103	20,000	28,400	44,000	38	36
	5 hr. 1400 deg. F., W.Q. +						
	5 hr. 570 deg. F., W.Q.	156	33,600	42,400	68,400	18	24
	5 hr. 1400 deg. F., W.Q. +						
Phosphor-bronze (88.25 Cu, 10.80 Sn, 0.08 Pb, 0.65 P)	5 hr. 660 deg. F., W.Q.	191	48,000	61,200	76,000	5	11
	as cast	113	13,000	22,000	47,200	30	12
High-tensile brass (58.87 Cu, 0.38 Sn, 0.10 Pb, 1.13 Fe, 1.03 Al, 1.00 Mn, balance Zn)	as-cast	124	13,600	26,800	65,600	29	23
	W.Q. = Water Quench						

plication is best obtained by trial in the particular piece of machinery. With respect to the bearing characteristics of the 88:5:5:2 nickel-bronze, insufficient data are available for definite conclusions to be drawn. For the past nine months a centrifugal water pump has been working continuously with heat-treated nickel-bronze bearings, and no trouble has been experienced. Recently the main bearings of an air compressor at the author's laboratory were replaced with bearings of heat-treated nickel-bronze, and up to now have been working satisfactorily.

While these examples are few in number, they at least indicate that the

alloy might have useful properties as a bearing material.

For many applications in shipbuilding, castings have to work in contact with fresh water and sea water. Admiralty gunmetal and phosphor-bronze are well known for their resistance to these media. Nickel-bronze compares favorably with the other two alloys.

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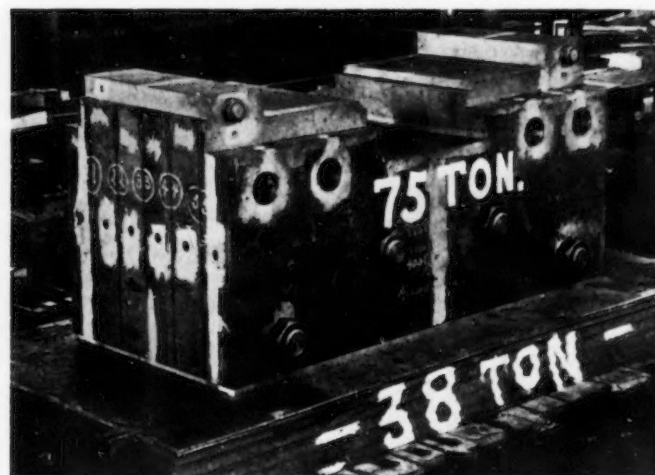
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Anvils of Rolled Steel Plate



THE rolled steel plate, or laminated anvil, has been developed to a point where it is very practical by Alliance Machine Co., Alliance, working in conjunction with the Canton Drop Forge Co. Conventional anvils are of cast construction.

It is stated that it is possible with rolled steel plates to determine in advance the safe fiber stress per square inch throughout the entire structure. In view of the dependability and uniform strength of rolled steel plates, it is possible to so proportion the anvil block that the stresses under all conditions are kept within safe limits.

The plates of the top section of the anvil (see accompanying illustration) are set on their edge. The length of the plate extends right to left, or in the same direction that they are rolled. The key pressure and the pressure from expansion of the anvil shoe,

right to left, due to heat from forging, extend along these same lines. If there should be a hidden fracture or flaw in one of the plates the result would be confined to a single plate, which in most cases would not seriously impair the effectiveness of the laminated anvil.

Each plate of the laminated structure is machined on both surfaces so that when the anvil is assembled a solid structure is secured. The machining of the surfaces of the plates also affords an opportunity to inspect the surface for defects.

There is a unique method of holding the plates from spreading. While tie bolts are used, they are largely for holding the plates while machining. The real tie, right to left, and top to bottom, is in the anvil shoe and shoe keys, which are a modified form of the

old "V" anvil cap or shoe. The Alliance principle differs from this in that the angles are in reverse and less steep. The angle of the shoe and wedges holds the plates in compression and prevents shifting in any direction. (See photograph). The shoe wedges are so designed that any lost motion developing is automatically taken out. The plates are further held together at the top by the over-lapping of the stands. The bottoms of the plates are planed and fit snugly into a machined pocket in the sub-base, preventing any downward, right to left, or front to back movement.

Provision has been made for lubricating the surfaces between the top and bottom sections, as well as means to prevent metal creep interference.

A laminated anvil is shipped by taking it apart and handling the individual plates.

Coordinate to Conquer

By COL. H. A. TOULMIN, JR.

THIS is the final chapter in Col. Toulmin's remarkable and timely series on National Defense. It exemplifies the thinking of an experienced soldier and industrialist who is as familiar with the requirements of modern war as he is with those of modern mass production.

If we are going to streamline our defense mechanisms of men and munitions to bring them into pace with modern war tempo, we shall have to take many of the steps that the author recommends. And the sooner the better.

No series that we have before published has attracted more attention or inspired more comment. Hundreds of letters have been received urging that it be reprinted and given a broad distribution.

It will be. We shall see to it ourselves that the entire series, combined into a booklet, is put in the hands of every member of Congress, as well as every important Washington administrator. And we shall make these booklets available at their cost of production, so that individuals and organizations can make them available to their members and friends.

"It soon become evident to clear eyes that the war would be fought and ultimately decided in the workshop and laboratory."

—LLOYD GEORGE
Minister of Munitions

EFFECTIVE organization and discipline for war is the acid test of democracy. If we meet it, then democracy works; or else!

Individual initiative is a peculiarly American force, but we cannot use it successfully for defense unless we show we know how to organize and control this ability. We must couple with this initiative corresponding au-

thority. The American way is to use initiative of the individual by controlling it through a coordinated organization—the very opposite of the totalitarian state. But we are not proceeding on the American basis now in our munitions management.

Such compromise expedients as our "Advisory" Defense Commission are only good starters of orders. The brilliant work done by "economic royalists" on reprieve and parole in placing orders will not get the orders filled and delivered. That is what counts in defense. You can't kill your enemy with an order blank.

The tragic gap in our defense plans, which remains unfilled, lies between the Government officials and our "ad-

visory" business helpers who are acting by courtesy only. All the latter can do is to place the orders—their authority stops there.

We are now in the honeymoon period of "courtesy" help. You cannot make effective war with "advice," "consultation" and "conciliation."

Let us look at the evils of this serious gap in our defense organization. The army designs equipment with the most absurd specifications and tolerances because an army officer must err on the side of meticulous accuracy to protect himself, but he never thinks of anybody else or his problem. He has no practical business and manufacturing experience. This was primarily the reason for the long delays in production during the World War. Let me illustrate. One day in 1917 a member of the French Military Mission came to me in great distress to politely call our attention to the fact that a prominent ordnance Colonel had designed a 75 mm. shell for the 75 mm. gun, but he made it too big. It was his idea of a shell and he would be damned if he would change it to fit a Frenchman's gun because he had a better shell, despite the fact that the only 3-in. guns we got were 75 mm. French weapons!

Then the army inspects production according to its own designs, again with unreasonable requirements. England tried this divided authority of War Department and Civilian Munitions helpers until Lloyd George be-

came Minister of Munitions and pulled her from the brink of disaster. He said:

"The rigid and hardened mentality of the War Office refused to bend or give to any facts that were not stale with age and chronicled in accepted military histories. They rejected all experience which they had not been taught during the training they received in the days of their remote youth. I had been driven by their stubborn attitude to the conclusion that if we waited until our Whitehall generals woke up to the realities it might be too late then to save the situation."

The real help from the Advisory Commission can only come from giving that Commission authority to make the designs practical for manufacturing and to control inspection. These business problems of production and inspection should no more be put in the hands of the army engineers than putting final inspection in the hands of the engineering department in a manufacturing plant.

Eighteen or Nine Months

A good example is the mechanical 3-in. fuse for artillery shells. It is now so designed that it will take 18 months for a competent manufacturer to get production orders started. That same manufacturer is now able, by putting manufacturing horse sense into the design, to make the same fuse in not more than nine months and probably in six, although it is a tough thing to make. In other words, getting contracts is one thing—getting the goods delivered to fight with is quite another. That is the basic weakness in materiel procurement in our National Defense Program.

Do you know of any successful corporation that calls in unpaid outsiders to buy its machines, plan its production, schedule its models, purchase its raw materials, and buy its plants? How long would such an organization successfully function in business with such outsiders operating under the direction of a corporate president who had never made a dollar and failed in every business enterprise he ever undertook? But that is the kind of mad house munitions management we are getting while plunging this country into twenty-five billions of additional national debt.

Here are some of the remedies for this situation:

(I) We need a national defense department as one *single* agency to force agreement on production plans, allocate priority on raw materials,

supervise inspection and get production. This one agency must be capable of giving final decisions promptly on the thousand and one details to bring orders to final successful delivery.

(II) We need a *single* agency to coordinate the army, navy and plans for production and it must not be "advisory." This agency must be equipped for the quick changes in design and manufacturing plans that the developments of war require. The only certain thing about war is change.

(III) We must have basic defense plans coordinated by a *single* defense department with the management and guidance of strategy and policy under a unitary command. The theory of a Commander-in-Chief, if in the person of the President, must now be made practical in a single national defense head to coordinate the activities of the three great branches of the service.

(IV) We need a school for inspectors and a great inspecting organization to see that the army and navy get what they want on time. The inspection of twenty-five billions of materiel is a job for masters and not for amateurs.

(V) We need a labor mobilization program to prevent competition between plants and to allocate and utilize the best labor where it rightfully belongs rather than let skilled men get into the ranks just because they are very patriotic citizens.

Let us look at Germany as our competitor and potential foe. For five solid years before the outbreak of war every conceivable resource was mobilized. These assets of Germany were persistently and consistently devoted to the single purpose of war preparation. Look at these significant increases in the German economy: iron rose from 52 to 151; machinery from 49 to 147; electricity from 100 to 206; and the number of industrial workers arose in six years from 3,711,000 to 7,325,000. The average working day, already long, was extended another hour. That is our competition.

The "American Way"

We do not have to be a totalitarian country but we can use our American genius to get results in our own way if we couple responsibility with authority and use our American ability for individual initiative and organization. The business men on the "Advisory Commission" have demonstrated that!

Every practical person knows that the really tough problems are going to be not only in the production of what we now want, but in adjusting production to those inevitable changes that come with war. Over night our enemies will be developing new materiel and we must change our production plans to meet them.

Work on much of the army's equipment has not yet started. The General Staff has had to change its basic plans twice. The Air Corps has already had to change its plane programs six to eight times.

Within 60 days a substantial force of the Regular Army has already been reorganized into the new mechanized divisions. It is reported that height finders will not be delivered before April, 1943. Many contracts show deliveries not until late 1941 and early 1942. No one can predict the changes during this critical period. We need an organization equipped to meet changes and to promptly take advantage of them.

Washington is the Bottle Neck

Tax restrictions, profit limitations, amortization, bottlenecks and production difficulties are going to mean just one thing. The public is going to rise up and crucify the Government for failing to get results. For instance, the Air Corps is still ordering ships loaded with instruments and all sorts of gadgets. It is still requiring tolerances for peace time usage and not war time expenditure—and there is no one to say "NO."

Let us look at a concrete proposal for making our system work in the American way. On the accompanying chart is a plan for a coordinator of defense, with these broad divisions under his direction: "Armament Production," "Mobilization," "War Planning," "Civilian Cooperation" and "Research and Invention." A Great Headquarters Command should embrace a strategic staff for coordinating the efforts of the Army, Navy and Air Corps with production and civilian mobilization.

Coordinated Defense

This coordinated defense will have one other major department under his direction: "Military Movements," which would embrace the work of military, naval and transport, and the embarkation and debarkation for defense of troops of our empire. All these major overall activities common to the three services must be interlocked by a single coordinating agency—that's American management.

Under the "Division of Armament Production" should be a Director of Munitions, a Controller of Raw Materials and a Director of Machine Tool and Gages. In addition there must be a Director of Aircraft Production and a Director of Government Plants.

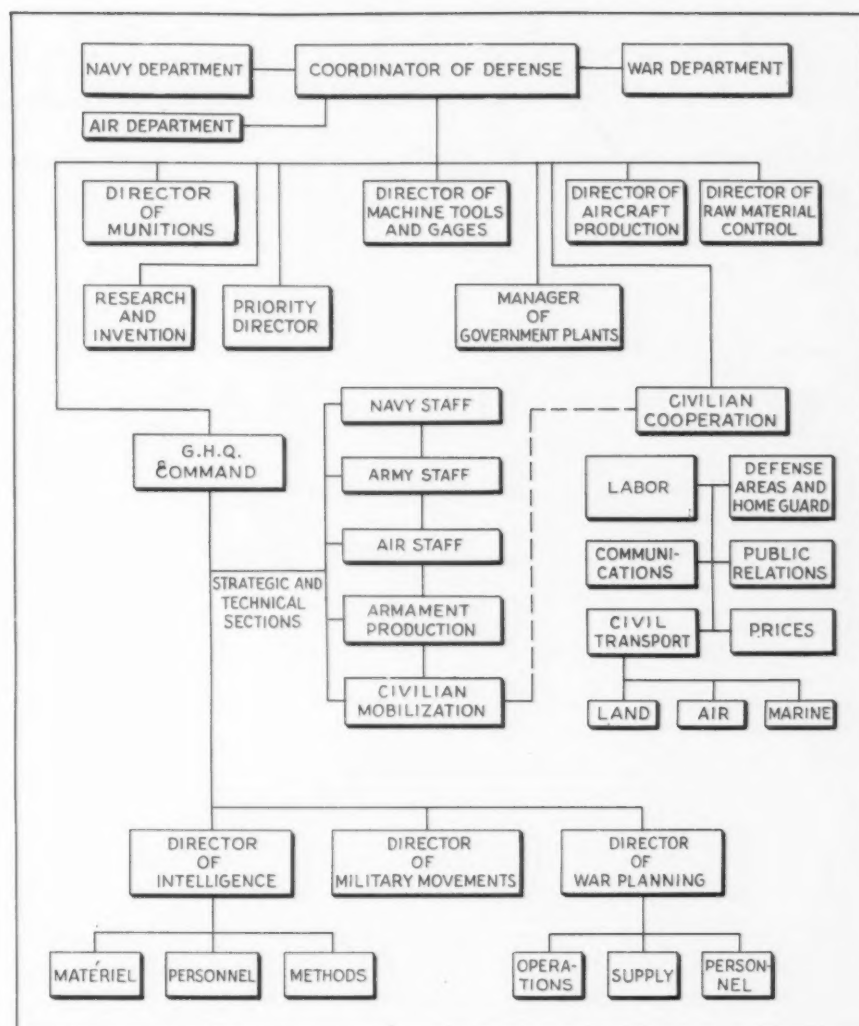
Under the "Division of Civilian Cooperation" come the headings of Civilian Labor, Civilian Defense Areas and Home Guards, Public Relations, Civil Transport, Price Control and Communication.

The G. H. Q. Command is a joint supervisory staff of Army, Navy, Air Corps, Staff Representatives; Production and Civilian Mobilization Directors acting in cooperation with an Intelligence unit and a Technical Operations, Supply and Personnel Control Staffs. This permits the coordination of intelligence for the changes in materiel and in methods of warfare to meet the enemy moves.

As it is now, every service is for itself without regard to the other—there is no agency to enforce teamwork in defense.

Let me make it clear that this plan *does not disturb* the Army and Navy Department and Services nor the Air Department, if we have one. It simply furnishes a master coordination organization, carrying out for our Commander-in-Chief, functions this country has grown too large to have performed by an individual.

The last and final recommendation in this series of articles is this department for the coordination of defense. Under it should be placed the present activities of the National Defense Council, the able members of



whom will then have definite power and authority to manage the job from the order to the delivered goods.

It will be the end of "advice" and the beginning of results. This is the

American way of making money and doing business. This is a business man's job and we need business man's teamwork to have a successfully defended America.

Physical Examinations

NEITZEL MANUFACTURING CO.,
MILWAUKEE, WIS.

PHYSICAL EXAMINATION

NUMBER

NAME _____ DATE _____ 19____
ADDRESS _____ AGE _____ APPARENT AGE _____
CONTEMPLATED OCCUPATION _____ MARRIED _____

HEIGHT	WEIGHT	NORMAL WEIGHT	BLOOD PRESSURE	DEFECTS
			S D	
EYES	WITHOUT CORRECTION	WITH CORRECTION	COLOR BLINDNESS	
	RT. LT.	RT. LT.		
EARS	WHISPERED VOICE	DRUMS	CANALS	WAX
	RT. LT.			
NOSE AND THROAT	NASAL OBSTRUCTIONS	TONSILS	THYROID	
TEETH	CAVITIES	ARTIFICIAL TEETH	GUMS	
HEART	PULSE AND CHARACTER			
LUNGS				
ABDOMEN				
FEMALE	BREASTS	MENSTRUAL DISTURBANCES		
GENITALIA	WASSERMAN (IF INDICATED)			
INGUINAL REGION	HERNIA	PATENCY OF RINGS	RECTUM	
SPINE	TENDERNESS	JOINTS	POSTURE	
VEINS	VARICOSE	ARTERIES	LYMPH NODES	
EXTREMITIES	ARMS	HANDS	FINGERS	LEGS
				FEET
SKIN	SCARS	TUMORS	PALLOR	ERUPTIONS
MENTAL	NERVOUS SYSTEM	REFLEXES	GAIT	SPEECH
INJURIES OPERATIONS	INJURIES—DATE		OPERATIONS—DATE	
PAST DISEASES	DATES		DATE LAST VACCINATED	
KIDNEYS	SP. GR. URINE	SUGAR	ALBUMIN	MICROSCOPIC (IF INDICATED)

IS APPLICANT FIT FOR POSITION INDICATED? YES ☐
NO ☐

REMARKS _____

(SIGNATURE) _____

EXAMINER

I HAVE NO SOURCES OF DISABILITY NOT DISCLOSED TO THE EXAMINER EXCEPT AS FOLLOWS: (BLANK HERE MEANS NO EXCEPTIONS)

(SIGNATURE) _____

APPLICANT

For Employees

—The Why and How

WITH the rise of labor unions and the establishment of property rights in a job, managements of even small companies are becoming more interested in physical examinations for all new employees. This offers the only protection against many hazards to which a business is now exposed.

RECENT trends in employer-employee relationships have brought physical examinations for new employees to the fore. For the larger companies with complete medical departments and a full time doctor, medical examinations for all employees have been taken as a matter of course for many years. However, the small company, which in the past has never hired employees on the basis of physical examinations, is now beginning to think of the desirability of such a procedure. It is in connection with the small company without a company doctor that the suggestions in this article may be of some benefit, particularly when first starting out on a program of physical examinations.

It used to be thought that physical examinations of new workers could be justified only on the basis of weeding out the unfit. Previously the feeling was that an exact status of the health of a new employee should be recorded so the employee could not later make any false claims under the workmen's compensation act covering ailments contracted before the employment began. This was particularly true of hernia. However, in recent years doctors and the industrial commissions have begun to regard hernia in a different light, the consensus of opinion being that only the exceptional case is occupational, the tendency toward hernia being somewhat hereditary.

Consequently, in recent times physical examinations have been justified

on a much broader basis than the elimination of the unfit. Physical examinations have been called the keystone of industrial health work. They should serve as a background and a stimulus for preventive medical work.

The following have been listed as the chief objects and advantages of physical examinations for employees:

(1) To place the worker in the occupation that suits him best

(2) To detect physical defects so that:

(a) They can be remedied

(b) The physical status at the time of employment can be recorded in case of future claims

(c) The accident prone man can be predetermined and thus accident frequency and severity rates reduced

(d) Complications following accidents can be reduced

(3) To determine present health status so that:

(a) Health can be improved

(b) Operating costs can be reduced by:

1—Reduced labor turn-over and death rate

2—Making possible an older average age of employees

3—Fewer employees because of reduced absenteeism

4—Creating better risk for group insurance carrier

5—Elimination of unemployment benefits for workers released after being poorly selected for the work

6—Prevention of building of seniority for employees who will later prove to be physically unfit.

(c) Employee's cost of living can be reduced by lessening medical expense in event of illness

(4) To prevent spread of communicable diseases by excluding infected persons

(5) To eliminate fraudulent claims for personal injury.

By EUGENE CALDWELL

*Consulting Management Engineer
Milwaukee*

After determining that physical examination of all new employees of the plant will be advisable, a working arrangement with a local physician must be made, unless of course the plant is large enough to have its own full time physician. Obviously the doctor's office should be as close to the plant as possible in order to save time in selecting groups of new employees. A physician who has had some experience examining employees for other industrial concerns or who examines applicants for life insurance companies will probably give more attention to this kind of work than a doctor exclusively in general practice.

What Factors to Consider

Having selected the doctor who is to make the examinations, it must next be decided what factors are to be examined. Physical examinations range all the way from a cursory examination lasting only a minute to a very expensive affair which includes X-rays of various types.

If physical examinations are adopted solely with the idea of weeding out the unfit, then it does not appear necessary to include anything on the examination blank that would not cause rejection of the applicant if found to be unfavorable. In other words there is no need to examine the applicant on a particular point unless it has some bearing on his acceptance as a new employee.

But if a broader purpose for physical examination is accepted, includ-

ing the desire to improve the health of future employees, then the examination must go into things bearing only indirectly upon the acceptance or rejection of the employee. Of course, the maximum improvement to the employee's health could be brought about by the most complete physical examination possible. Consequently, some compromise between the barest necessities for selection purposes and a reasonable amount of additional information must be made.

The items to be examined in the physical examination should, of course, be set down on a printed form to be used by the physician. Each company must make up its own forms since there has been no standardization of forms. Even the life insurance companies, whose business depends entirely upon physical examinations, have not standardized upon the examinations given in connection with life insurance applications. As a matter of fact, the various life insurance companies are not all in agreement as to what factors should cause rejection of an applicant. One company will turn down all applicants having the slightest tendency toward high blood pressure, while another company may place more emphasis on questionable urine analysis.

Great assistance in selecting a proper examination form can be obtained from the National Safety Council, American Medical Association, National Industrial Conference Board, and the Metropolitan Life Insurance Co., all of which have suggested forms. The nature of the company's business should, of course, be taken into account in designing the form to be adopted. If the plant is particularly hazardous, requiring keen eyesight for safety, this factor should be stressed. On the other hand a plant with a few hazards will probably have some other condition requiring special emphasis. Indeed, different occupations in the same plant require emphasis on different factors. For example, any signs of heart trouble would cause immediate rejection of an applicant for a job as crane operator whereas the deficiency would not be considered so serious for the position of switch-board operator. A form used by one company is illustrated herewith.

After the exact form for the examination is decided upon, there should be standardized a list of deficiencies that will cause rejection. Any of the deficiencies that are corrected are usually not permanent bars to employment. If the applicant is willing to have the difficulty corrected, he can be

re-examined and later accepted. In fact some minor deficiencies may allow conditional employment subject to correction of the difficulty.

In order to set up what deficiencies are to be the cause of rejection, it is necessary to have a knowledge of medicine and know the impairment of a man's efficiency and ability each ailment will cause, together with a thorough knowledge of the physical requirements of each job in the plant. Consequently this seems to be a task needing the counsel of both the doctor and the management of the plant.

Too Severe Restrictions

Obviously deficiencies should not be listed that will never cause any impairment of efficiency or any untimely death or retirement of the employee. Unneeded restrictions sometimes eliminate otherwise desirable workmen and boost employment department costs.

The army has rigid physical requirements not particularly because the rejected applicant is less fit for army service but because any physical deficiency makes the proposed soldier more vulnerable to injury in battle and therefore less reliable as a soldier and more likely to draw compensation in the event of exposure to an injury.

One company operating in the Middle West lists the following deficiencies which it deems important enough to cause rejection:

(1) **Anemic, underweight, overweight and generally unfit physically.**

(2) **Active or recent active tuberculosis.**

(3) **Mental deficiency.**

(4) **Heart disease.**

(5) **Inguinal (direct or indirect), femoral, ventral, abdominal or post-operative herniae, even though small.**

(6) **A strong tendency to hernia.**

(7) **Undescended testicle.**

(8) **Defective vision.**

A—Drivers (including motor tank truck drivers, salesmen, etc.) must have a minimum central visual acuity of 20/40 in both eyes with or without glasses. (An applicant with 20/20 in one and not less than 20/50 in the other eye with or without glasses will be accepted.) They must also have perfect color vision.

B—Warehousemen and the like must have a minimum central visual acuity of 20/40 in one eye and 20/100 in the other eye with or without glasses. They should also have good color vision.

C—Office employees must have a central visual acuity of not less

than 20/30 in one eye and 20/120 in the other eye with or without glasses.

(9) Defective hearing.

Total loss of hearing is cause for rejection of any applicant.

A—Drivers must have normal hearing, i.e., 20/20 in both ears.

B—Warehousemen, etc., must have a minimum of 20/20 in one ear and 5/20 in the other ear.

C—Office employees must have a minimum of 10/20 in one ear and a minimum of 5/20 in the other ear.

(10) History of epilepsy.

(11) Active gonorrhea, syphilis or neurosyphilis.

(12) Marked crippling, either of body, arms, legs, hands, or feet due to previous accidents, operations or diseases.

(13) History of previous attacks of rheumatism, particularly if frequent and which have left more or less stiffness of joints.

(14) Skin rashes of any kind which are infectious or unsightly, or bad scars from operations which are unsightly. Bad varicose veins or history of varicose ulcers.

(15) Applicants with high blood pressure or kidney disease should be rejected. Blood pressure should be taken and urine analysis made of all applicants.

Many of the reasons given in the early part of this article in justification of physical examinations for new employees apply equally as strongly in support of giving regular physical examinations to all present employees. Sometimes the management is hesitant about introducing this health measure because of the reaction against it on the part of the employees. These objections can be held to a minimum if it is generally known that everyone in the organization including the president must take the examination.

Also it is important that the results of the examination be kept as private as possible. It is rarely necessary that the information has to be known by anyone other than the employee and the doctor or at most by the plant nurse or someone in the personnel department. These examinations need never come to the management itself if proper specifications for rejections are given to the doctor or employment department. The matter of privacy is particularly important if the examination is to include a Wasserman test because of the natural sensitiveness on this subject. Wasserman tests are being included in more and more industrial examinations irrespective of the fact that this makes the regular examinations more expensive.

Improved Technique Triples Die Life

BY installing modern heat treating equipment, the Wilson Steel & Wire Co., Chicago, has been able to increase die life 120 to 230 per cent and has reduced the necessary number of daily die set changes by half, thereby saving in a year's time more than the cost of the new furnaces.

A year ago, Wilson was hardening dies for heading common and roofing nails in equipment which had been in use for many years, with all operations depending entirely upon the skill of the operator. Because plant light varied from hour to hour during the day, the operator, who judged his temperature from the color of the dies, albeit quite skilled, was seldom able to secure the same degree of hardness in each set of dies. In addition, it was practically impossible to eliminate decarburization unless the dies were scaled to a point which rendered them nearly useless. Consequently, die life ranged from an incredible low of 10 min. to a high of 20 hr., the average on roofing nail dies being somewhere between 5 and 6 hr. Common nail dies averaged about 15 hr. each.

In order to do away with these variations and lift die life, Wilson's engineers rebuilt their hardening shop around a new Hydryzing hardening furnace and a Cyclone box-type tempering furnace (right and left respectively in the accompanying photo). Absolute elimination of scale, the presence of which would ruin the delicate nail dies, and a positive guard against decarburization, were additional essentials that were realized by this equipment, according to Wilson.

Today, roofing dies which formerly averaged from 5 to 6 hr. useful life are being used an average of $13\frac{1}{4}$ hr., based on the experience involved in some 300 die sets. Common nail dies are averaging around 50 hr. life, and some special dies have given as high as 168 hr. of production. Before these modern heat treating methods were inaugurated at Wilson, the 60 nail machines required an average of 50 die set changes a day under normal operating conditions. The new equipment has

reduced this loss by exactly one-half, 25 changes now being averaged daily among these 60 machines. Since each set of dies costs approximately 40c. in direct labor and steel, Wilson is saving about \$10 a day, or almost double the original investment within a year. Furthermore, each time a set is changed requires a machine to be shut down about 15 min., so here too the savings are obvious.

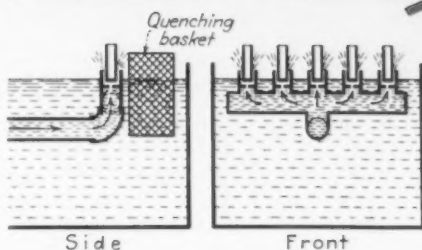
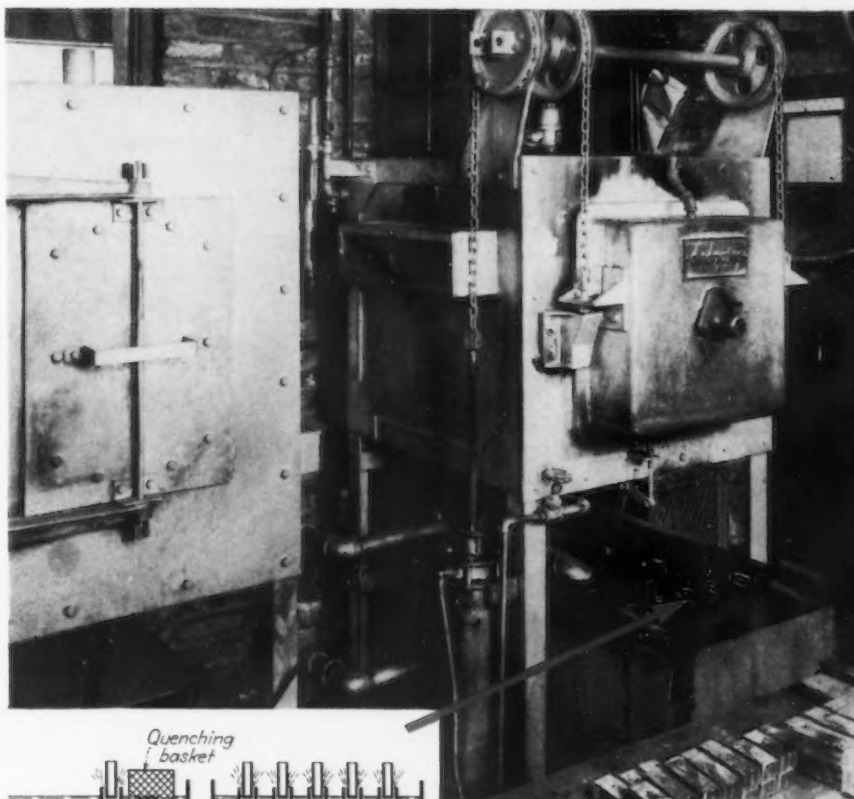
The analysis of the steel used in the dies is 1.10 C, 0.30 Mn, 0.018 S, 0.011 P, 0.14 Si, and 0.20 V. Hardening temperature has been standardized around 1440 deg. F., with the draw ranging from 375 deg. on common dies to 425 deg. on roofing dies.

Directly under the door of the hardening furnace, which incidentally is air actuated and controlled from the floor, is a small water quench tank, as shown in the accompanying sketch. Extending across the width of the tank is a

manifold connected to a water pipe independent of the tank water. This manifold is fitted with five nipples, through which water bubbles from the pipe line, and into which are placed die racks of different sizes for various types of dies.

Since only the face of the die need be hard, only the lower half is immersed in the stream of water. When the face end has cooled sufficiently the die is removed from the stream and dropped into the basket at the front of the quench tank. The use of a stream or flush on the face of the die makes soft spots due to steam unlikely, and lessens the possibility of air pockets forming in the depression.

An important feature of this device is that the dies can be removed from the furnace and set in the nipples, making it unnecessary for the operator to hold each die in the stream. Rapid quenching with a minimum of effort is thus possible.



Proper Sub-Assemblies For Welding

By E. W. P. SMITH

Consulting Engineer, Lincoln Electric Co., Cleveland

o o o

DETAILED consideration of what at first might appear to be minor factors often results in startling cost reductions. A few simple examples illustrate this fact.

If an angle is to be joined to a plate primarily for stiffening and the edge of the plate serves as the locating surface, then the location of the angle is not of vital importance. (See Fig. 1.) However, it may be easier to use the plan of Fig. 3, where the angle is the locating surface. Both of these are relatively easy to fabricate. However, the plan shown in Fig. 2 is more expensive, because both the angle and the plate are locating surfaces and it is necessary to scarf these or machine the weld. A little thought given to this item will save considerable money in the shop.

Next, take for example, the two joints shown in Fig. 4. In one case the plates require scarfing and in the other they do not. The comparison is obvious.

Another example is that of the joint of the two plates shown in Fig. 5. In one case, one plate is set back and the usual fillet weld is made. In the other case, however, the one plate is not set in so far, and the base metal is melted and part of this base metal forms the bead. Reduction in cost results because the speed is higher and less electrode metal is required. This is comparable to a square-groove joint.

The relation of two parts to each other offers another study for cost reduction. Such a relationship is that of a head at the end of a casing as shown in Fig. 6. The head may be fitted inside the casing (left) which results in a rather difficult fit-up in order to obtain good contact between the head and the casing or wrapping plate. It requires that the parts be accurately made and that care be taken in the fit-up. In the other case (right) the head is placed on the end of the casing. This requires that the casing be straight-cut and bent—but it permits a slight adjustment of the dimensions of the casing and allows a quicker and easier fit-up.

Along the same general lines as

above, the following illustrates the problem of final assembly.

Proper plate thickness to meet the requirements should be given careful thought. Fig. 7 shows the corner of a machine. Looking at the joint, it might be possible to make the parts "B" and

"C" of one piece of heavy plate, and the part "D" of lighter plate. Just a brief glance at the cross-section of these joints indicates how great the cost reduction may be.

It is true that welding itself is inherently a low-cost method of joining parts of metal, nevertheless indifference and thoughtlessness in designing may greatly decrease or nullify possible cost reduction. These various factors, kept in mind and given thought in the drawing room, should produce substantial economies.

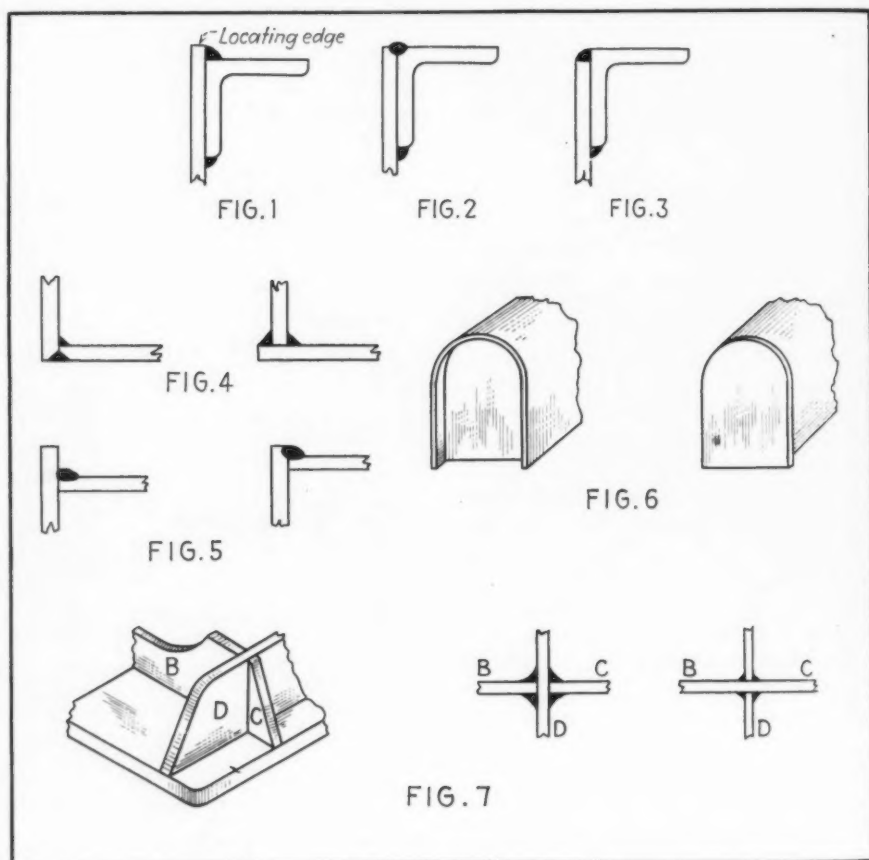


Fig. 1—One location of angle stiffener. Compare with Figs. 2 and 3. Fig. 2—Stiffening angle flush with locating edge. See also Figs. 1 and 3. Fig. 3—Stiffening angle above locating edge. See Figs. 1 and 2. Fig. 4—Joint scarfed (left) and not scarfed. Fig. 5—Joint with one plate set back for fillet weld (left) and with one plate placed so as to utilize base metal for weld. Fig. 6—Head inside casing (left) and over end offers interesting cost comparison. Fig. 7—Corner of machine illustrates possibilities of cost reduction through use of plate of proper size, efficiently cut to the design.

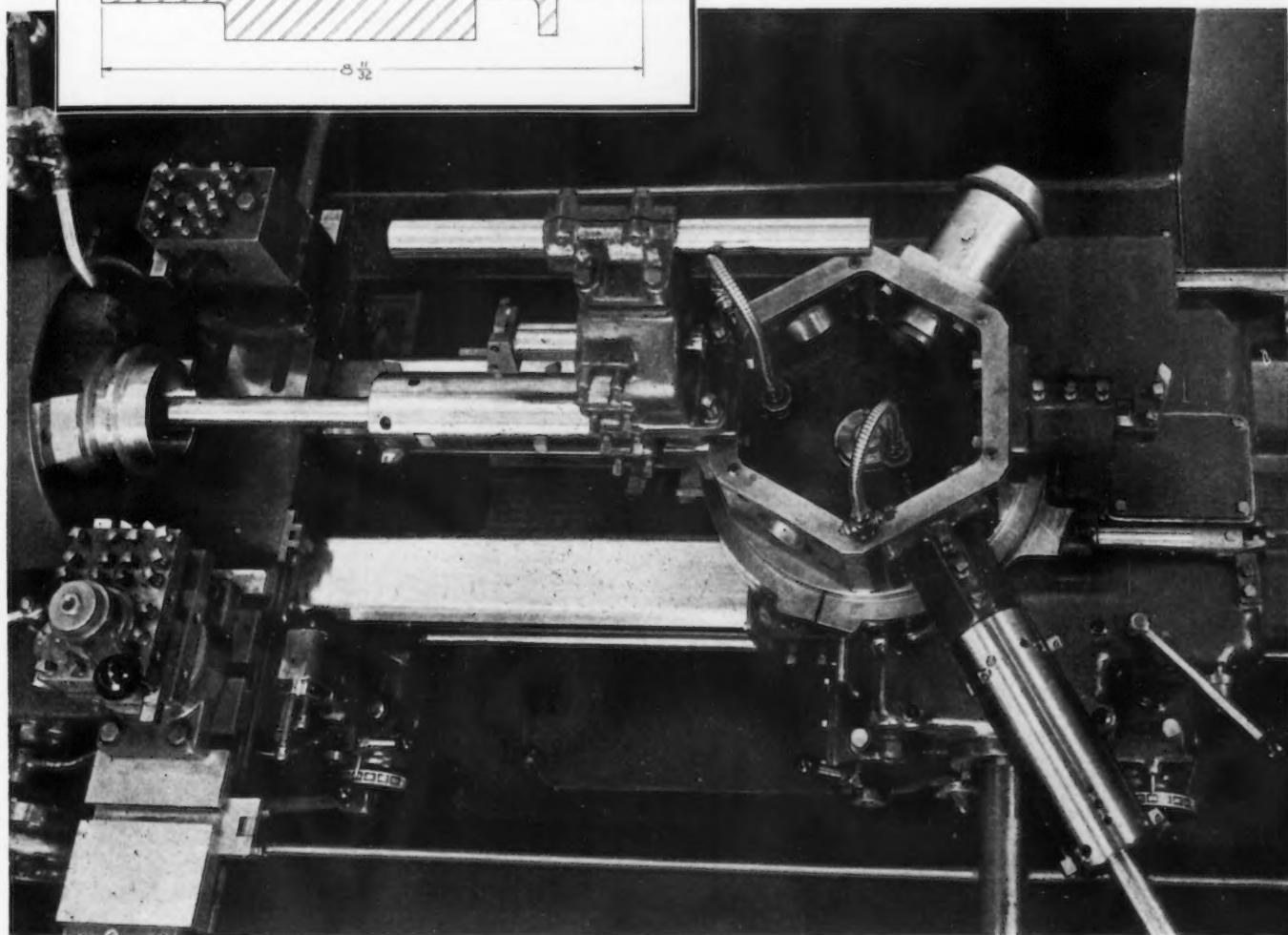
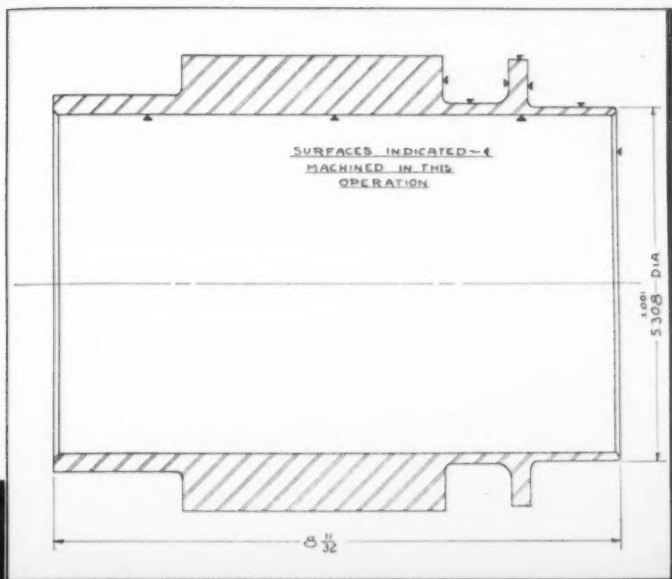
A HIGHLY SPECIALIZED JOB ON A

Standard

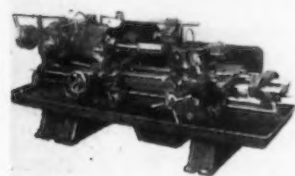
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TURRET LATHE



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PROFIT PRODUCING MACHINE TOOLS

DETROIT — So many times in the last 40 years the "perfect" car has made its appearance, only to be the forerunner of other newer models and more "perfect" cars, that it is a little early to predict that the millennium has arrived. Nevertheless the industry is going to be paying tribute in the next twelve months to one group of automobiles which appear to be, for the time at least, samples of "perfect" streamlining.


The topic of the streamlined automobile is a touchy one, whether you are talking to the administrative executives of the automobile industry, the salesmen or the engineers and technicians. Artists with a flair for futuristic work have pictured all variety of highly streamlined automobiles, but the industry's leaders have been cautious about putting such artistic conceptions into production.

Except for an occasional freak automobile, the outstanding exceptions in production of streamlined vehicles are the Chrysler Airflow, the Lincoln-Zephyr and the Graham Paige. Others have never gone more than part way along the path that these production cars have attempted. Today a new group of cars, about to take the road as 1941 offerings, combines lines pioneered by all of the earlier streamlined cars—without copying from any of them—and really sets a new pace for all concepts of automotive streamlining. These are the Buick and Pontiac, which have already been seen, and the Olds, understood to be comparable since it is part of the General Motors BOP lineage. (Buick, Olds and Pontiac use bodies from the same dies).

"Torpedo" Leads in Streamlining

PROBABLY it is another case of saying that the "perfect" car is here, only to find that this is just another stepping stone in the evolution of the automobile, but the fact remains that the "torpedo" sedanette, or the sedan coupe as it is variously called, comes somewhere near to being the ultra-ultra of streamlining as far as present types of automobiles are concerned. It is freely conceded that cars with power plants in the rear may be more highly streamlined, and that cars of the future may be more highly refined as regards streamlining; nevertheless it is difficult to imagine any important departure that could be made from the lines which have been laid down for some of this year's models.

The Pontiac, which has exclusive use of the proper name Torpedo for 1941, will introduce on Sept. 12 three lines of Pontiac Torpedoes. They will be the



**On The
Assembly Line**

BY W. F. SHERMAN
Detroit Editor

• New General Motors cars highly streamlined . . . Pontiac back in production after quick changeover . . . Heavy bumpers feature all 1941 models . . . Detroit still arguing merits of steel framing for houses

Torpedo DeLuxe, the Torpedo Streamliner and the Torpedo Custom, replacing last year's Special Six, DeLuxe Six, DeLuxe Eight and Torpedo Eight. Each of the three lines of new Torpedoes will be available either as a six-cylinder car or eight-cylinder car.

Wheelbase on the smallest of the three cars will be 119 in., compared with 116½ in. last year. Wheelbase on the other two lines of cars will be 122 in., compared with 120¼ in. and 121½ in. for the bigger cars last year.

Most distinguishing detail on the Pontiac cars will be deeply impressed "character lines" horizontally on front and rear fenders. Besides being longer, the cars will be considerably wider than last year's models and will have built-in, concealed running boards which

are covered by the flared-out bottom on each door. Several variations of the long, tapering "fast" back will be available, with the sedan coupe, a six passenger model, having the most pronounced streamlined shape.

Pontiac is back in production after one of the shortest changeovers in history. The last 1940 car was produced July 3 and production was resumed in early August at a much higher rate than was anticipated earlier in the year. Originally, plans called for an August production of only 4500 cars, but successive increases were ordered, and, on Aug. 20, lines were running so smoothly and optimism was so high at the Pontiac plant that Harry Klingler, general manager, authorized an increase in the schedule for the month from 10,000 to 11,000.

Bumpers Are Heavier

AMONG the details observed on the cars this year are the heaviest and most formidable looking bumpers ever seen on an automobile. Many small, important refinements have been introduced, including a switch on the door frame which turns on the dome light when the right front door of the car is opened. Considerable more chromium and stainless trim is used on the outside of the body this year, with chrome used freely on window reveal moldings and belt moldings.

The question of streamlining and of the ultra-modernization of motor vehicles is one that comes up frequently for discussion among auto-minded individuals. Invariably mention is made of the Chrysler Airflow and its failure to "click." Among all the automobiles that have been built, this one undoubtedly was the "perfect" car of its day—or of today, for that matter. Soundly engineered, embodying more fundamentally correct principles than any other car up to



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**WORKING
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Sounds fanciful, but it's really quite simple—One loading station and Seven working spindles in place of a single work station, and all operations simultaneously; that's the whole story.

Once it was thought these 420 second minutes were only for manufacturers with long production runs.

But not so. A surprisingly large number of shops which have miscellaneous jobs, some running as low as 200 pieces, are making profitable use of Mult-Au-Matics, now that they realize that the tooling can be easily and quickly changed over. If you have work of this sort, talk with a Bullard Engineer. Remember, there are numerous sizes and types of Mult-Au-Matics. One is very likely to be ideal for your needs.

BULLARD

THE BULLARD COMPANY
BRIDGEPORT, CONNECTICUT

that time; utilitarian to an extreme; comfortable; well-built and enduring; roomy, and having every other attribute that the advertising copywriter might jot down—it unmistakably did not meet with popular appeal. Appearance was a little against it because it was so radically new that people could not readily adjust themselves to it, and its failure to pass the "buying test" ruled it out of Chrysler's lines after a few years of trying to put it across. Engineers have felt keenly that sting, but have finally come to accept the conclusion that the car was just ahead of its time. More recently, the arty-looking Zephyr models have found wide public acceptance and the best explanation for change in public sentiment is that it has taken the public all this time to become used to the ideas embodied in such designs.

Steel Framing for Houses

Possibly the same hesitancy has something to do with the current arguments in Detroit over whether

steel framing shall be permitted for houses. Bids were submitted and opened several weeks ago on the S. James Herman Gardens housing project being sponsored jointly by the City of Detroit and the U. S. Housing Authority. The lowest bid for a reinforced concrete job on the project that will have 2,150 dwelling units was \$8,330,000, submitted by the A. Smith & Co. and Lippman Construction Co. of Chicago. The lowest steel bid was \$8,300,000 submitted by the Maurice R. Bein, Inc., at Bridgeport, Conn. To the lowest steel estimate was added \$15,000 for concrete first floor and \$25,600 for painting the ceilings. Either bid would make the dwelling unit cost approximately \$4,043, in comparison with the general average cost of \$4,410 in other U. S. H. A. projects throughout the nation.

The type of framing involved is the Stran-Steel (described in *THE IRON AGE*, May 18, 1939) framing which has been used in the Ford Foundation Housing Project near Dearborn and in several other pri-

vately sponsored housing projects. The matter has been argued for several weeks in the Housing Commission and Detroit Council meetings.

Wilson Foundry Revamped

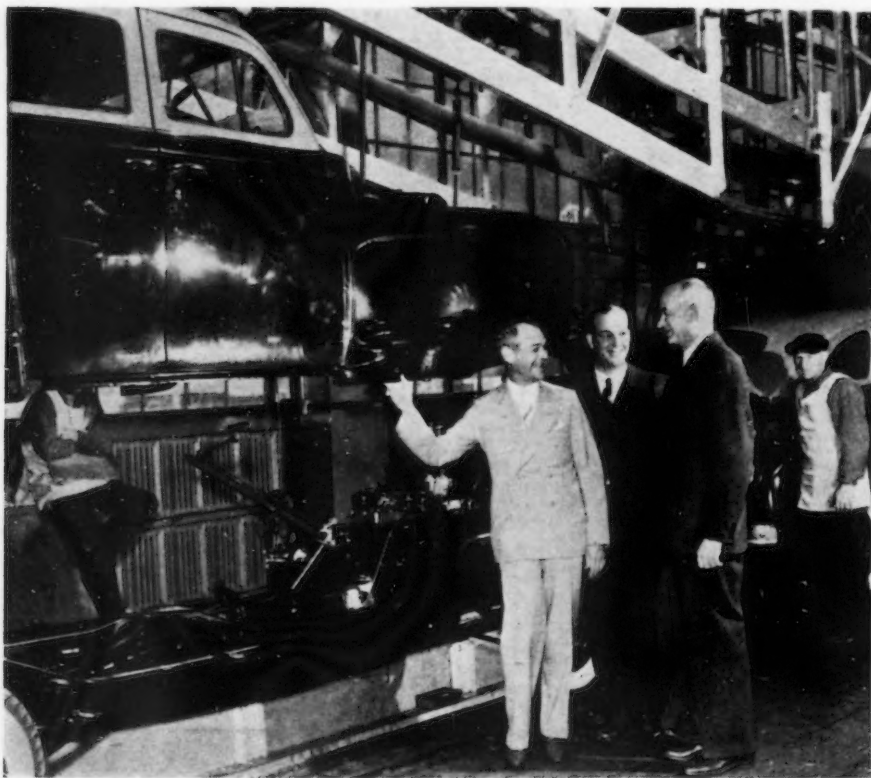
Within a few days the Wilson Foundry & Machine Co. buildings at Pontiac, Mich., will be revamped and ready for "all eventualities" in the national defense program, it has been announced. The Wilson Foundry is a noted name in the automobile industry, having been for years one of the important suppliers of automotive parts.

Sales Gain is Factor

Earlier expansion this year in the Detroit Transmission Division of General Motors Corp., while undoubtedly intended to provide extra productive capacity so at least two other lines of General Motors cars, besides Oldsmobile, could be equipped with the hydramatic transmission, appears not to have worked out that way at all—at least for this year. First of all, it appears that a factor is increase in automobile sales which promises to permit Olds to absorb whatever extra production the plant can accomplish on automatic transmission and hydramatic drive. In addition, it seems that Olds executives thought that they were entitled to another year's exclusive use of the hydramatic drive and its sales features. Last year, it will be recalled, the driving mechanism was the principle sales feature emphasized by Oldsmobile, but production difficulties made it impossible to get easy delivery of cars with this unit until some time about March, 1940. Meanwhile, for more than six months, Olds advertising and sales efforts had been more or less directed in a channel which could not have been otherwise than unproductive. This year it is hoped that Olds can cash in on some of the effort it put forth last fall and winter on this subject. There is still the unconfirmed possibility that Cadillac and LaSalle will offer the hydramatic transmission also, but this grows more doubtful.

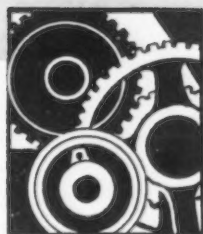
Automobile production for the week ended Aug. 23 climbed to 23,732, compared with 20,475 in the previous week and 17,765 a year ago, according to Ward's Automotive Reports.

NEWEST THING IN ASSEMBLY LINES—complete assembly of bodies, fenders and other sheet metal on a twin rail, overhead assembly line has replaced the conventional body drop in the main Plymouth plant at Detroit. D. E. Eddins, Plymouth president, left, and E. S. Chapman, Plymouth production vice-president, center, show P. W. Gaebelen, operating manager of Chrysler Motors of California, how the 1941 sheet metal parts are built up in a single rigid unit and then located on the chassis.



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Interruption of maintenance for new construction purposes may impose a penalty on production far more costly than it is worth.

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WASHINGTON — Soon after the Third Term Candidate Roosevelt entered upon his campaign for perpetuation in the White House, there was evidence and published charges that, in an effort to cover up its gross failure, the New Deal once again would make "big" business its whipping boy. Remarks by pet satellites of the administration pointed to this tactic. They were made over the air, in speeches and in conversation. These statements for the most part were in the nature of implications rather than direct accusations. But whatever their character the inference was clear that (1) "big business is for appeasement with Hitlerism; (2) it is not cooperating in the national defense program."

Fittingly enough it remained for bitter-tongued Harold L. Ickes to confirm the charges that the New Deal is trying to make big business the scapegoat. In his radio outburst of distortion and venom this "administration hatchet man's" so-called reply to Wendell L. Willkie's acceptance speech ran true to form. Picturing it as a villain, he held up Mr. Willkie as a symbol of big business.

"Mr. Willkie's current party contains the men who think that they can appease Hitler by making a deal—the big business men who were caught conferring in secret with a notorious Nazi agent, Dr. Westrick," Mr. Ickes snapped. "Mr. Willkie's current part includes the men who think that they can ward off social reform by calling the reformers Reds."

"Mr. Willkie's current party includes the men who think that big business should be allowed to capitalize a grave national crisis for its own private profit; that, somehow or other, the country will muddle through if only the party of big business and appeasement is given an exclusive right to handle the defense program."

Appeasement in Business?

THERE may be an "appeasement" sentiment in business. The same may be said for labor, religious, pacifist and other groups which are in no way associated with the professional or fifth columnists. The people of the United States dread the idea of war but the appeasement sentiment reflects only a minor sentiment whether in business or other respectable groups. Appeasement itself, wholly undesirable even if possible, actually would mean either destruction of decent civilization or constant warfare between primitive feudalism and democracy until one or the other is knocked out, and if the world has to submit to the former, then neither business nor anything else in



• Drive to convince public industry isn't cooperating in national defense program opens at Washington . . . Ickes makes keynote speech in New Deal effort to place the blame on business

the world would matter.

Certainly Mr. Willkie, whom Mr. Ickes scorned as a symbol of big business, as if that was frightfully odious, threw down a challenge to Hitlerism even more sweeping than any that has come from the Roosevelt administration, though Mr. Willkie made it evident that in championing democracy, he would prepare to take up the fight, economic or otherwise if necessary, rather than merely hurl words. Said Mr. Willkie:

"I promise, by returning to those same principles that overcame German autocracy once before, both in business and in war, to outdistance Hitler in any contest he chooses in 1940 or after. And I promise that when we beat him we shall beat him on our own terms, in our own American way. The promises of the present

administration cannot lead you to victory against Hitler, or anyone else. This administration stands for principles exactly opposite to mine. It does not preach the doctrine of growth. It preaches the doctrine of division . . . why that is exactly the course France followed to her destruction."

If these are the words of big business then Mr. Ickes' allegation that it is for appeasement falls flat, and becomes ridiculous. Even Mr. Ickes in his opening remarks, and with characteristic inconsistency, offered his gratuitous thanks to Mr. Willkie "for standing squarely with the President for aiding with our material resources those people who are resisting Hitler's aggression."

The attack on big business for so-called failure to cooperate in the national defense amounts to the serious charge that big business is unpatriotic. At least it would be serious if the source of the absurd charge were responsible and capable of being fair. Ever from a realistic point of view, as well as from a patriotic motive, business would be definitely unbusiness-like if it did not do all in its power to preserve its own welfare and investment for defeat in war would ruin both.

New Deal Blames Industry

BUT seeing that its constant baiting, regulating and attack on free enterprise has left business and government both in a state of disorder and confusion the New Deal is trying to cover up its blunder and the country's lack of preparedness by laying the blame on big business. Big business, so Mr. Ickes and other New Deal satellites say, is interested in profits only, though those in the administration who have direct charge of the national defense report quite differently. Rather than damning business they pay

Tonic For Production



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average of 25% faster than conventional cutter grinders.

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it tribute for its efforts and point out that some enterprises of pressing immediate importance to national defense are taking capital risks out of their own funds.

Realizing that a corporation is responsible to stockholders and their investments, they know that industry cannot be reasonably called upon to make heavy financial outlays out of its own pocket for plant expansion, only to see, as it saw after the first World War, these enterprises and their equipment rendered useless and destroyed without compensation from the government.

Amortization Delayed

The administration itself recognized the necessity of amortization allowance and some weeks ago asked for immediate legislation on the subject, though unfortunately asked that it be tied in with an excess profits tax bill, instead of separating the two and pushing the first through Congress at once in order to prevent delayed national defense work. The legislation finally is emerging before Congress.

The administration meanwhile had done nothing to push the legislation. Now the National Defense Advisory Commission has again pointed out the importance of getting the amortization program under way. Some of those in the administration, including Mr. Ickes, are quite wealthy, but it has been observed that, while they are eager to criticize big business for not risking their money on plants that are useless in peacetime, are careful to preserve their own cash. They are taking no risks, which they might do, as an example of a patriotism they seem to claim for themselves only.

Only Paper Profits

The profits for industry of which Mr. Ickes so glibly speaks will, as he must know, be only paper profits. The excess profits taxes will see to that and there can be no reasonable complaint that this should not be so. But unless business is assured against loss there can be no national defense production. The "war profits" not only will be a passing thing but industry inevi-

tably will be considerably disorganized for commercial operations from its transformation to national defense needs.

They must and will be provided, but both socially and economically it is an undesirable business. And administration baiters to the contrary, business, big, medium and little, will do its part. It is doubtful that this effort to cover New Deal failures by smearing business will get very far. The effort has become threadbare and it obstructs and disunites at a time when speed is highly necessary to the well being of the nation.



• • • The Reconstruction Finance Corp. is creating two additional corporations, the Defense Plant Corp. and the Defense Supplies Corp., each with a capital of \$5,000,000, to aid the National Defense Advisory Commission and the War and Navy Departments in the national defense program.

The Defense Plant Corp., said Federal Loan Administrator Jesse Jones, is necessary in some instances in connection with plants, equipment and machinery, particularly for the manufacture of airplanes, airplane engines and airplane parts.

The Defense Supplies Corp. has been allocated \$50,000,000 to acquire, for storage at strategic points throughout the country, a substantial supply of high-test gasoline for the War and Navy air services. No specific sum has yet been set aside for use by the Defense Plant Corp.



• • • The U. S. Department of Commerce has published a pamphlet on the new commercial standard CS5-40, covering brass, copper, steel and wrought iron pipe nipples. This standard represents a revision and consolidation of three former commercial standards relating to pipe nipples, and became effective for new production on May 10, 1940. The pamphlet may be obtained from the Superintendent of Documents, Washington, for 5c.

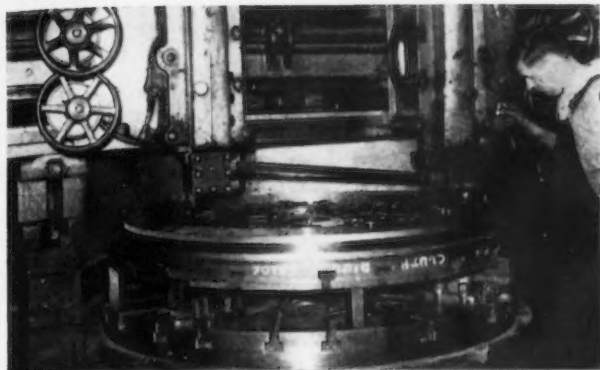
THE BULL OF THE WOODS

BY J. R. WILLIAMS

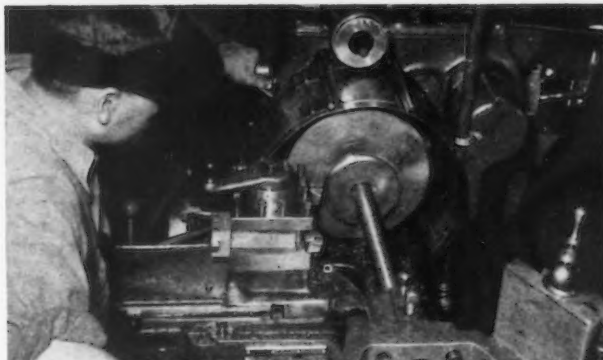


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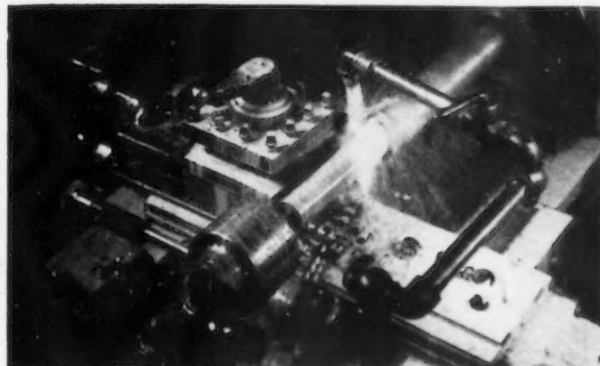
In These Well-Known Machine Tool Plants...



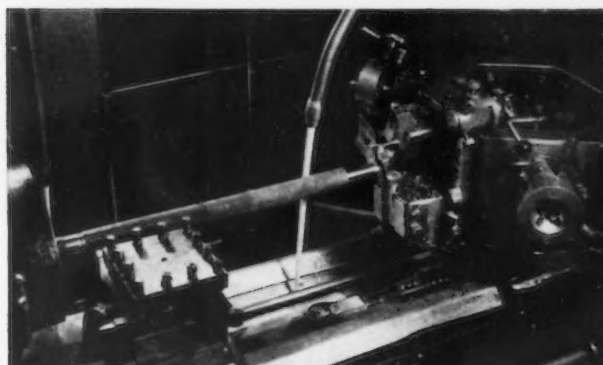
AT BULLARD—A 33% average increase in machine capacity on more than 1000 Carboloy applications! Photo: Machining 0.60 carbon steel clutch rings for V. T. L.



AT GISHOLT—They stepped up production one-third on over 1000 jobs through the broad use of Carboloy tools! Photo shows one of 800 steel jobs tooled with Carboloy.



AT MONARCH—Carboloy applications number between 1000 and 2000 and have doubled machining output on those jobs! Photo: Turning S.A.E. 2350 shaft.



AT WARNER & SWASEY—More than 2500 Carboloy jobs resulted in an average of 43% increase in machine capacity! Photo: Turning S.A.E. 4140 shaft.

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Fatigue Cracks

—BY A.H.DIX—

Success Formula

••• We like this sentence in Alfred P. Sloan's "Adventures of a White-Collar Man," now running in the Satevepost:

It is astonishing what you can do when you have a lot of energy, ambition and plenty of ignorance.

Success is so often a matter of not knowing it couldn't be done.

Squawk

••• A blue note in the symphony of praise played by this journal's thousands of loving friends reads:

"You are always bragging about the excellence of your service. Yet I sent a postcard in several weeks ago for some literature listed on your "Information Free" page and you haven't sent it to me yet."

In dodging this tomato tossed at our 18 and 8 escutcheon, may we explain that the literature isn't stocked here. We simply forward the inquiries to the firms that issue the booklets and bulletins. Our part is done promptly. If the issuer falls down we would like to know so that we may Take Steps.

Zero Trouble

••• No program involving all the vast details in spending \$4,500,000 (for national defense) can be carried through to completion without criticism developing from many sources.

—From a trade paper editorial.

We won't kick even if it runs 'way up to five million

Scotch and Slogans

The word *slogan*, we learn from *Printers' Ink*, comes from the Scot "slaugh-ghairm," meaning battle cry. Which gives us an opportunity to air your favorite family journal's own modest little battle cry—"The World's Greatest Industrial Paper."

It used to be that people thought slogans packed a powerful sales wallop, but now they are regarded in most quarters as just so-so—something you can either take or leave alone. Like uncorked gin they lose their potency in time. We wave ours every now and then just to preserve our franchise. And even though it is as true as it was 10, 20 or 50 years ago, we would rather air love letters like these:

There is nothing I can add to the good things that have already been said about Iron Age. However, *Fatigue Cracks* is good medicine when one can't relax and I am pleased to learn that additional copies of the editorial on Wendell L. Willkie can be had . . .

—N. H. Schueler, Secretary,
The Pea Harvester Co., New Holstein, Wis.

The last issue failed to reach us. If you have a copy left will you please forward it, as we intend never to miss a single issue.

—Lawrence W. Leeper, President,
The Cotton Chopper Co., Dallas, Tex.

We wish to compliment you on The Iron Age. We use it extensively in our plant . . .

—Alvin N. Hass,
Bud Radio, Inc., Cleveland.

Stoppers

••• "Hey, Joe, Lend Me 200 Amps for Five Minutes"—Harnischfeger Corp.

"I Was Dead Wrong!"—Allis-Chalmers
Black Light Bags Crooks—G-E Mazda Lamps
Rescued with a By-Pass—Crane Co.

Crusader

••• Tens of thousands of students and scholars in China are entirely devoided of means to advance their studies. Facing this intellectually hungry lot, it is my crusading responsibilities and pleasures to write for complete sets of your publications.—From the Librarian, National Central Library, Chungking, China.

We are sending copies, but today's newspaper reads, "Half of Chungking has been destroyed by aerial bombing, bearing out the belief that the Japanese have now set about to burn the entire city."

Elocution Lesson

••• Reprints of that Wendell L. Willkie editorial of July 11 have now run 'way over the five-figure mark. Which gives us a good opportunity to urge Mr. Willkie to disregard Hugh Johnson's advice that he raise his voice at the end of a sentence to increase his effectiveness on the air.

Maybe Iron Pants refers to volume, which is O. K., but if he means pitch, we think his advice is poor. For in his acceptance address Mr. Willkie did elevate his tone at the end of sentences, as some preachers do. The effect, it seemed to us, was unfortunate, for it drew attention away from the importance of his message and focused it on his manner of saying it. We hope Mr. Willkie will stay away from the elocution experts and talk the way he did on "Information Please."

Bell-Ringer

••• That ad of R. S. Stokvis & Sons' in the Aug. 3 issue, headed "Blitzkreig Bargain," offering steel sheets that had been made for export, brings this from George R. Woods, who occupies No. 1 chair at Stokvis:

"The day the ad appeared our telephone sounded like votes coming in for one of Major Bowes' stars. Sold P.D.Q."

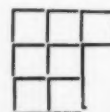
Etymological Lulu

••• Lank, erudite Emerson Findley, your favorite family journal's Cleveland manager, sends in a bulletin issued by Arthur D. Little, Inc., containing the word *serendipity*, with the remark that it is one of his ten-dollar favorites. This little gem is no stranger to IRON AGE readers. In accordance with our practice of giving you nothing but top-shelf goods, it was unveiled here last March in an article by Technical Editor Thomas Wendell Lippert.

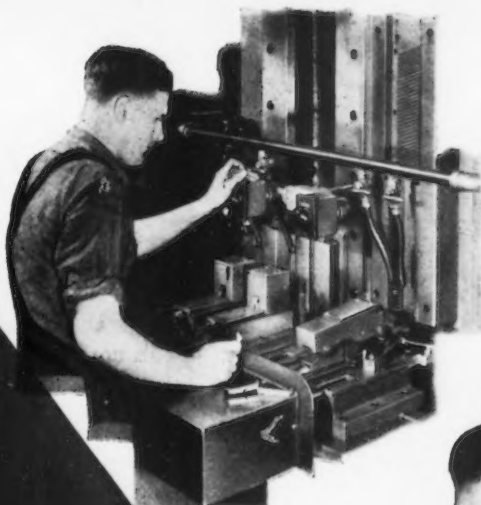
It means the gift of finding unsought some valuable or agreeable things while searching for something else, as if you didn't know. You can wow your friends with it, if you have any luck in working the conversation around to the point where you can toss it in casually, without having someone get bored and saying, "Did you hear the one about the volunteer nurses and the sergeant-major?"

Puzzles

If you can get this before the coffee cools you are definitely of the mental type:



Rearrange three matches and leave five squares.



920 OPERATIONS PER HOUR
Double Slide Oilgear broaches 3 surfaces on each of two parts, and 4 surfaces on each of two parts per cycle. Used in sequent operations. Conveniently located controls.



Trademark
Reg. U. S. Pat. Off.



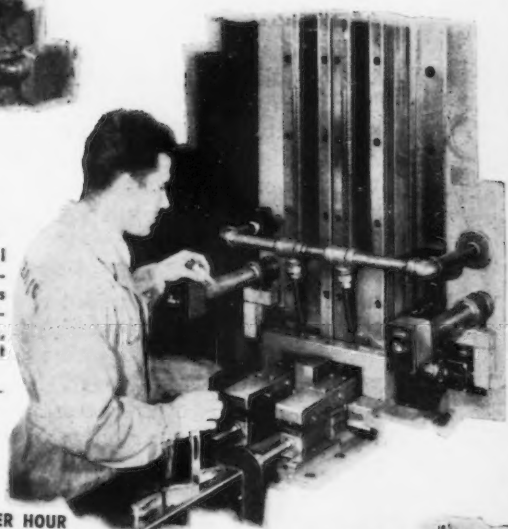
760 PIECES PER HOUR
Oilgear Vertical Pulldown Broach, showing centralized dual pushbutton control and exceptional convenience in loading the work.

BETTER FASTER BROACHING

The Oilgear Company announces important new redesign in their varied and complete line of Broaching Machines. The movement, control and operation of these machines have been so simplified, made so convenient and handy, that the operator is able to get maximum capacity from his machine.

In addition, broaching and return speeds have been increased, and may be varied independently of each other. Cycle speeds are faster. The machines are more flexible. They work at peak loads up to 150% of normal capacity . . . yet are fully protected against harmful overloads. Big users report immediate gain in production. Use the handy coupon below to secure complete descriptive literature. Write today. **THE OILGEAR CO.**, 1324 W. Bruce St., Milwaukee, Wisconsin.

500 PIECES PER HOUR
Oilgear Single Slide Vertical broaches $3\frac{1}{4}$ " irregular contour surfaces of two rifle parts per stroke. Work automatically clamped and unclamped, utilizing straight in and out motion of shuttle table.



920 OPERATIONS PER HOUR
on Oilgear Double Slide Broach. Each cycle broaches 4 special contour surfaces on 2 parts, and 3 steps and larger radii on 2 other parts.



Biggest

Oilgear 40 Ton Double Slide Vertical Surface Broaching Machine . . . largest of its kind in world. Finish broaches 50 large forged steel Diesel connecting rods and caps per hour . . . 100 crankshaft bearing caps per hour.



600 PIECES PER HOUR
Oilgear Single Slide machine broaches flats on 3 pieces. Exceptional loading and unloading convenience, new centralized control, high speed table, broaching and return speed and other advances.

OILGEAR
fluid power
BROACHING MACHINES

The Oilgear Company, 1324 W. Bruce St., Milwaukee, Wis.
Please send descriptive bulletin of the following new Oilgear Broaching Machines. (Check which)

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| <input type="checkbox"/> XL Horizontal | <input type="checkbox"/> XS Single Slide Vertical |
| <input type="checkbox"/> XD Double Slide Vertical | <input type="checkbox"/> XP Vertical Pulldown |
| | <input type="checkbox"/> XM Cyclematic |

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Company.....
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ALSO AN EXTENSIVE LINE OF PRESSES FOR PUSH BROACHING

News of Industry...

Detroit Industry Speeds Plans To Make Engines, Tanks

Detroit

• • • A roundup of latest developments in planning for defense production in the Detroit area includes further details and developments in the planning for manufacture of airplane engines and army tanks.

Plans are being formulated for the buildings which will house the Ford Pratt & Whitney engine manufacture at River Rouge Plant and the Chrysler tank manufacturing operations at the new site purchased last week northeast of Detroit.

In the case of Ford, erection of a building may be underway almost any day now because, as has been stated, building plans made while Ford was engaged in the Rolls Royce negotiations may very well serve for the Pratt & Whitney job—or at least will provide a complete background of information from which to work. The Chrysler tank plant is another matter. The type of manufacture is so different from anything else encountered in the industrial field, and so different from Chrysler's own experience, that the plans now are in only a preliminary stage and may require some months before construction is started. It is anticipated, however, that steel for this project may be let shortly on a tonnage basis to insure delivery.

Ford also has an advantage in the tooling for manufacture of the Pratt & Whitney engine because such tooling is already in existence in the P & W plant. Therefore, this phase of the program is expected to be completed shortly. Unofficially, it is estimated that, in a building to be constructed almost immediately, Ford will begin to move in machine tools as rapidly as delivery can be effected—so that actual production on the government's order for 4000 engines may be underway in five or six months. This move is expected to

free Pratt & Whitney at that time to step up its output on British orders, of which it has a tremendous backlog. Incidentally, the total of more than 4000 engines ordered from Ford is regarded as merely an initial order, it has been indicated.

Meanwhile, Ford is continuing development of a V-12, liquid-cooled, aircraft engine of his own

Great Britain Fixes Machine Tool Prices

• • • A new control of machine tools order, just issued by the British Ministry of Supply, states that no person in the United Kingdom shall pay or receive for any new machine tool produced in the United Kingdom any price other than a price fixed by the Minister of Supply.

The order also establishes a price for machine tools produced in the United Kingdom, and sold for use in the United Kingdom, and identical with those on offer for sale during a standard period which is taken as the six months ended Dec. 31, 1935. The types of machine tools affected are specified.

design and is understood to be completing the design of an airplane which Ford Motor Co. also will manufacture. Ford's progress on this engine is not in the least a matter of conjecture. Ford has ordered sample parts and accessories for this engine, which will use fuel injection instead of conventional carburetion and will develop 1500 hp. Deliveries on parts for the sample engines (which were ordered nearly a month ago) is scheduled to be completed within about the next 60 days.

A summary of other up-to-the-minute developments include:

CHRYSLER—E. J. Hunt, Chrysler staff master mechanic, has

been put in complete charge of the tank "corps." And therein lies something of a story. When Chrysler first began negotiations for the manufacture of the tank, it was more or less anticipated that the big new Dodge truck plant on Mound Road, the other Dodge plants in Detroit and the relatively new DeSoto plant on the west side of Detroit would cooperate in the manufacture of the tanks. In fact, all Chrysler plants engaged in some degree in the preliminary work on the tank project. However, the decision eventually was reached to confine the activity of various Chrysler plants to their current work, including, at the truck plant, the manufacture of Army trucks which have been ordered in increasing numbers. Out of all this eventually resulted the plan to erect a new plant and to get together a special staff to do the tank work. At present, various Chrysler engineers and production men on a "loan basis" are engaged in the work but it is anticipated that before long definite transfers will be effected to form the permanent tank plant.

Finally, there comes an answer to some of the questions about the power plant to be used in the tanks. A 450 hp. radial (aircraft type) engine will be used in these 25-30 ton tanks. The engine, to be mounted in the rear of the tank, will be supplied from some source other than Chrysler. The general guess is that Continetal (Muskegon) engines will be used because at the same time that the Chrysler tank order was announced in Washington, announcements were made about important orders placed with Continental for power plants.

Power transmission still seems to be something of a problem on these tanks. There has been talk of a huge fluid flywheel to replace the clutch, which is considered a weak point in such vehicles. Contrary to earlier reports of a 14-speed transmission, the transmission to be used will have something like five forward speeds and two reverse speeds.

To a population unacquainted

with military vehicles, mention of a 25-30 ton tank has raised the question of "how big will it be?" Size might be guessed from photographs which have been published showing exactly this type of tank in action or in process of manufacture. The answer is that the tank will be about 18 ft. long, approximately nine ft. wide, and nine ft. high.

Some of the machine tools required for tank manufacture have already been ordered. In fact, at the time that the tank contract was made public, commitments had been virtually issued for some of the equipment which Chrysler tool engineers had decided would be required for production.

BRIGGS—Although a Navy appropriation for the development of a high powered aircraft engine was given to Briggs Mfg. Co. late last year, it is virtually impossible to discuss this project which is reported to be on the Navy "restricted" list. However, rumor has undoubtedly stretched the facts a bit in indicating that the engine is virtually ready for production and that a plant will be erected shortly to build this power plant. Starting from scratch, as the Briggs engineers did, working with a single-cylinder setup for development tests, it is almost impossible for them to have completed an engine design by this early date. It is believed that a multiple-cylinder arrangement exceeding 12 cylinders has been assembled for test.

Meanwhile, the Briggs aviation staff has already moved into the new office building which has been erected since announcement that the company would become a subcontractor to airplane manufacturers for the production of sheet metal parts. The office building was occupied 90 days after estimates were first asked for the construction work. One factory building 300 x 277 ft. is nearly completed and another building is contemplated for erection soon and one older section of factory building has been revamped for use in aircraft manufacture.

Packard has carried its Rolls-Royce engine program right up to the point of placing volume orders for manufacturing equipment. Delay in making purchase, it is reported, has been due to the failure of Congress to vote an amortization plan. That the program may

proceed at an early date, however, is indicated by the announcement of Federal Loan Administrator Jones that RFC expects to finance Packard through an \$8,000,000 loan. Once official authorization has been given, Packard's machine tool buyers are ready to release specifications and orders for almost all major equipment, it is understood.

On the other hand, it is admitted that engineers and production men are in a quandary on many vital details on the Rolls Royce engine. A dispute, apparently of a major nature, has arisen over the question whether British engineering and design standards shall prevail over American standards on the parts and accessories which must be incorporated in the engine. It appears, however, that this dispute is being settled amicably, even though not rapidly, by compromise.

The kind of thing that is causing difficulty is not only the question of what type thread shall be used on nuts, bolts, studs, etc., but what type of accessories and units should go with the engine. For instance, it was not indicated originally whether the British wanted the engine supplied with propellers or not. If they decide to supply

their own propellers, then it appears that no standard design can be used for propeller shaft, but that one type of propeller shaft end must be supplied for Britain, and another type for the U. S. Army. Similarly, fuel pumps, carburetors, magnetoes and other units are causing difficulty. The carburetor for instance, is said to be a French type adapted to the Rolls Royce, while the magneto is said to incorporate British parts and standards which were ruled obsolete in the United States ten years ago.

U. S. Defense Contracts Cleared \$2,100,445,017

•••The following contracts were cleared on Aug. 19 by the Production Division of the National Defense Advisory Commission.

War Department: Savage Arms Corp., Hartford, gun equipment, \$15,000,000.

Navy Department: Various contractors, ammunition, \$2,608,680 and Miehle Printing Press & Mfg. Co., Chicago, gun equipment, \$4,101,019.

The total of contracts cleared for award by the National Defense Advisory Commission now amounts to \$2,100,445,017. The Production Division clears contracts over \$500,000. Actual execution of the contracts by the appropriate service follows clearance by the defense commission.

New Book by C. B. Cole Published on Tool Making

•••The American Technical Society, Chicago, has published a new book on toolmaking by C. B. Cole, president, Tool Equipment Sales Co., and past chairman of the Chicago Chapter of the American Society of Tool Engineers and of the Chicago section of the American Society of Mechanical Engineers. The book treats in a practical manner of toolroom tools and measuring instruments, machine tools, heat-treating methods and the construction of cutting tools, jigs, fixtures and dies. The "how-to-do-it" method of presentation is used, largely through the use of drawings of typical jobs.

Coming Events

- Sept. 3 to 6—American Society of Mechanical Engineers, fall meeting, Spokane, Wash.
- Sept. 18 to 20—National Industrial Advertisers Association, annual conference, Detroit.
- Sept. 19 to 20—Concrete Reinforcing Steel Institute, semi-annual meeting, Skytop, Pa.
- Sept. 24 to 27—Association of Iron and Steel Engineers meeting and exhibition, Chicago.
- Oct. 2 to 5—Electrochemical Society, Inc., fall meeting, Ottawa, Canada.
- Oct. 13 to 16—American Gear Manufacturers Association, semi-annual meeting, Skytop, Pa.
- Oct. 16—Porcelain Enamel Institute, fifth annual forum, Urbana, Ill.
- Oct. 17 to 19—American Society of Tool Engineers, semi-annual meeting, Cincinnati.
- Oct. 21 and 22—Associated Machine Tool Dealers of America, annual convention, Dayton, Ohio.
- Oct. 21 to 25—National Metal Congress, Cleveland.
- Oct. 31 to Nov. 2—Society of Automotive Engineers, national aircraft production meeting and exhibition, Los Angeles.

Willkie for "Unlimited Productivity" Opposed to "Distributed Scarcity"

• • • Wendell L. Willkie's belief in a philosophy of unlimited productivity as contrasted with the theory of "distributed scarcity" is expressed in these passages from his Aug. 17 speech accepting the Republican presidential nomination.

"I am a liberal because I believe that in our industrial age there is no limit to the productive capacity of any man. And as I believe that, I likewise believe that there is no limit to the horizon of America.

"I say that we must substitute for the philosophy of distributed scarcity the philosophy of unlimited productivity. I stand for the restoration of full production and re-employment by private enterprise in America.

"And I say that we must henceforth ask certain questions of every reform, and of every law to regulate business or industry. We must ask: Has it encouraged industries to produce? Has it created new opportunities for our youth? Will it increase our standard of living? Will it encourage us to open up new and bigger worlds?

"A reform that cannot meet these tests is not a true liberal reform. It is an 'I pass' reform. It does not tend to strengthen our system, but to weaken it. It exposes us to aggressors, whether economic or military. It encourages class distinctions and hatreds. And it will lead us inevitably, as I believe we are now headed, toward a form of government alien to ours, and a way of life contrary to the way that our parents taught us here in Elwood.

"It is from weakness that people reach for dictators and concentrated government power. Only the strong can be free.

"And only the productive can be strong.

"When the present Administration came into power in 1933, we heard a lot about the forgotten man. The government, we were told, must take care of those who had no other means of support.

With this proposition we all agree. And we still hold firmly to the principle that those whom private industry cannot support must be supported by government agency, whether federal or state.

"But I want to ask any one in this audience who is, or has been, on relief whether the support that the government gives him is enough. Is it enough for the free and able-bodied American to be given a few scraps of cash or credit with which to keep himself and his children just this side of starvation and nakedness? Is this what the forgotten man wanted us to remember?

"What that man wanted us to remember was his chance—his right—to take a part in our great American adventure.

"But this Administration never remembered that. It launched a vitriolic and well planned attack against those very industries in which the forgotten man wanted a chance.

"It carried on a propaganda campaign to convince the country that all business men are iniquitous.

"It seized upon its taking power for political purposes. It has levied taxes to punish one man, to force another to do what he did not want to do, to take a crack at a third whom some government agency disliked, or to promote the experiments of a brain trust. The direct effect of the New Deal taxes has been to inhibit opportunity. It has diverted the money of the rich from productive enterprises into government bonds, so that the United States Treasury—and no one else—may have plenty to spend. Thus much of the money of the rich is invested in tax-free securities.

"The New Deal's attack on business has had inevitable results. The investor has been afraid to invest his capital, and therefore billions of dollars lie idle in the banks. The businessman has been afraid to expand his operations and therefore millions of men have been turned from the employment offices. Low incomes in the cities and irresponsible experiments in

the country have deprived the farmer of his markets.

"For the first time in our history American industry has remained stationary for a full decade. It offers no more jobs today than it did ten years ago—and there are 6,000,000 more persons seeking jobs."

Amortization Holds Up Electric Furnace Expansion

• • • Although a substantial amount of new electric furnace steel capacity has been installed since the first of the year, or is being installed, as mentioned previously in THE IRON AGE, it has been learned that a sizable amount of additional capacity is pending, apparently awaiting Congressional action on some type of amortization legislation involving national defense projects.

Build High Octane Gas Unit at Cleveland

Cleveland

• • • Construction has been started on new storage tanks and a special unit for production of high octane gasoline at the Standard Oil Co. of Ohio refinery here. The project is a part of a \$1,000,000 program for new equipment for the company's plants here, at Lima, Ohio, and at Latonia, Ky.

Republic Declares Preferred Dividends

• • • Republic Steel Corp. has declared a dividend of \$1.50 per share on the 6 per cent cumulative convertible prior preference stock, Series A, and a dividend of \$1.50 per share on the 6 per cent cumulative convertible preferred stock was declared, payable Oct. 1, to stockholders of record Sept. 12.

Sheet & Tube Declares 25c. Dividend on Common

• • • Youngstown Sheet & Tube Co. has declared a dividend of 25c. a share on common stock, payable Oct. 1, to stockholders of record Sept. 12. Directors also declared a dividend of \$1.37½ a share on the 5½ per cent preference stock.

Metal Containers Limited in Britain

London

••• Under an order issued by the British Ministry of Supply, metal containers for face powders, cigarettes, confectionery, cocoa, and many other products will soon disappear from British stores. Many more articles, including soups, fruit, vegetables, condensed milk, and tobacco, will no longer be sold in small cans.

These new restrictions and prohibitions are expected to save nearly 50,000 tons of tin plate and sheet steel annually for the making of shells. Manufacture for export and for special government purposes, however, will not be affected.

The order also bans the use of

tin plate or sheet in the manufacture of advertising novelties and show cards, counter displays, dummies, metal tablets, oil cabinets, shelf strips, waiter trays, and window displays. It specifies approved sizes for cans for oils, paints, general chemicals, and many foodstuffs. Consumers are asked to use existing containers for storing future purchases, and to return to retailers all cans they do not need.

SCRAP PILE—This cable photo, passed by the British censor, shows one of the dumps in south-east England to which the wreckage of German aircraft is being hauled. The dump covers 20 acres and is being enlarged, according to the British, by five or six wrecked planes a day.

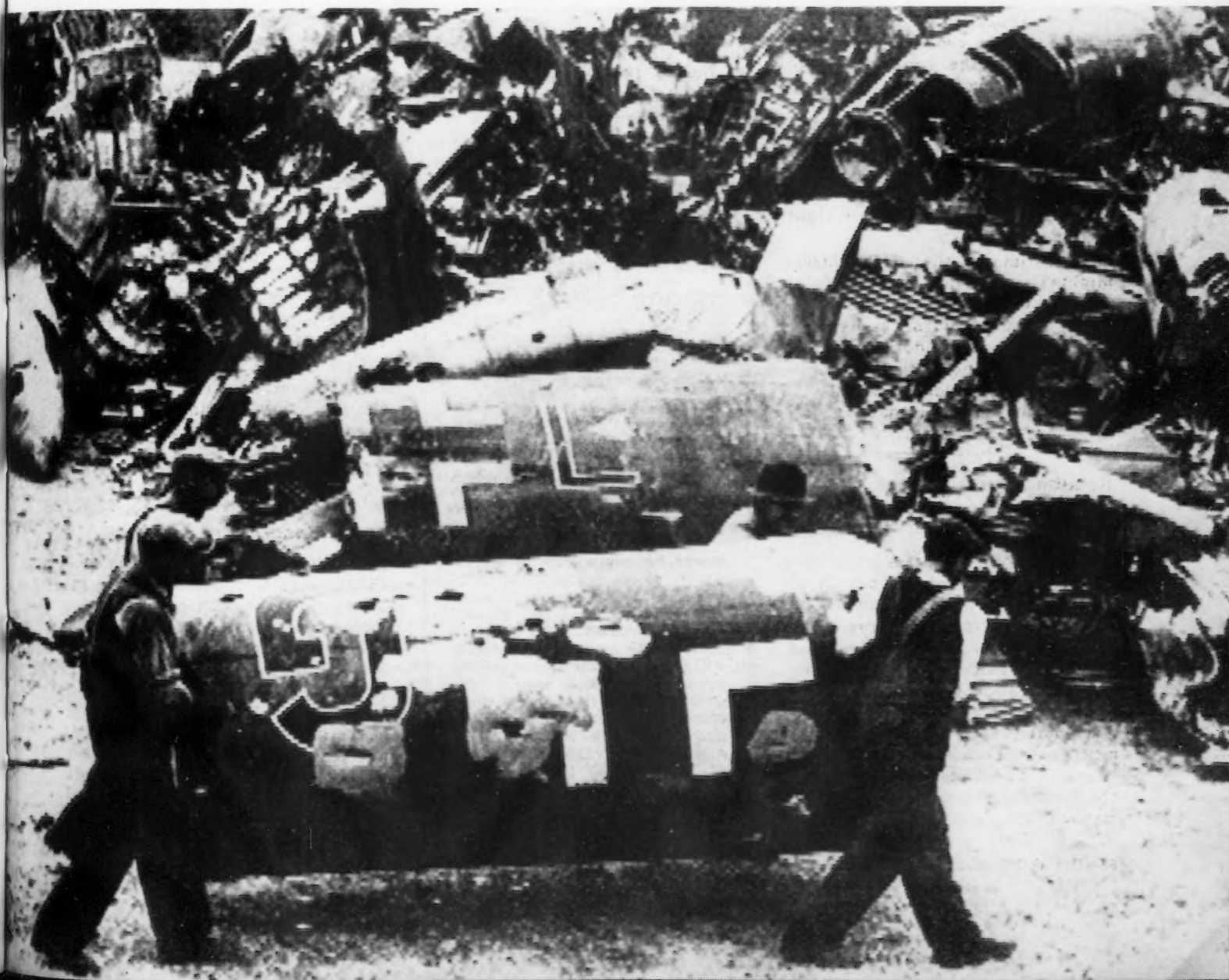
—By Wide World.

RFC Loans Money For Plane Plants

Washington

••• For the purpose of acquiring plant sites and erecting and equipping plants for the manufacture of airplanes at Buffalo, N. Y., Columbus, Ohio, and St. Louis, the Reconstruction Finance Corp. has made a loan of \$34,000,000 to the Curtiss-Wright Corp. The RFC also has agreed to lend the corporation up to \$15,000,000 for labor and materials and other necessary expenses in manufacturing the airplanes.

Federal Loan Administrator Jesse Jones, in making this announcement, said that the RFC has further agreed to lend to responsible cooperating companies up to \$2,160,000 for the purchase



of machinery and equipment and other facilities to produce necessary parts for construction of the planes.

"These commitments were authorized in contemplation of the Curtiss-Wright Corp. providing additional plant capacity and facilities satisfactory to the War and Navy Departments and securing orders from the United States Government for at least 3791 airplanes.

Loans of \$10,500,000 to the Boeing Aircraft Co., and \$17,000,000 to Bendix Aviation Corp., maker of airplane parts, also were made for new plant construction, expansion and equipment. RFC Chairman Emil Schram said that Boeing plant expansion at Seattle, Wash., will involve \$7,000,000 or \$8,000,000 and at Wichita, Kan., \$2,500,000 to \$3,000,000.

The newly organized Defense Plant Corp., Mr. Jones said, probably will handle the financing involving \$8,000,000 of equipment that the Packard Motor Car Co., will require in connection with its contract for the construction of 9000 Rolls-Royce airplane engines, 3000 for the United States and 6000 for Great Britain. The Defense corporation also, Mr. Jones explained, may supply about \$20,000,000 of the total of \$92,000,000 that has been loaned to the Wright Aeronautical Corp.

He estimated that \$150,000,000 might be expended by the Metal Reserve Co. for acquiring tin and about \$60,000,000 for manganese ore. Mr. Jones said that 770,000 tons of manganese has been contracted for of which about 240,000 tons are of domestic material, all coming from Montana.

Republic Leases Clyde Mines from W. J. Rainey

Cleveland

••• Republic Steel has leased for 25 years the Clyde Mines from W. J. Rainey, Inc., Pittsburgh. The lease covers some 5000 acres. The mines are in Washington and Green counties, south of Brownsville, Pa., and produce about 6000 tons of coal daily and employ approximately 1600 men. Coal shipments can be made by either water or rail. The mines will be under the management of E. B. Winning, manager of Republic's.

U. S. Revives 1918 Bethlehem Case

Washington

••• The Department of Justice announced last Thursday that it had moved to bring before the Supreme Court of the United States a case in which the United States asks modification of wartime contracts made with the Bethlehem Shipbuilding Corp. in 1917 and 1918.

In a petition, remarkable for its bitter terms, for a writ of certiorari filed with the Court by Solicitor General Francis Biddle, the government described the contracts to be so "unconscionable and to have given Bethlehem such inordinate profits that a court should not enforce them." The question, the petition states, is "of immediate national concern" because of the government's present armament program.

This latter statement was taken to indicate that the Department of Justice will seek a court rule under which any industry attempting to defend so-called excessive profits will receive scant, if any, consideration.

The petition, which comes at a time when efforts are being made

in some political quarters to prove that industry will not cooperate with the government during an emergency, presents two suits for review by the Supreme Court. One was brought in April, 1925, by the United States to recover so-called excessive profits already paid to Bethlehem, while the other was brought by Bethlehem in January, 1926, to recover over \$7,500,000 profits not yet paid to it. The United States District Court for the Eastern District of Pennsylvania held that the United States could not recover the profits already paid and that Bethlehem was entitled to \$5,270,000 as profits due but not paid. The circuit court of appeals at Philadelphia affirmed this decision.

Australia to Build 235 Mile Pipeline

London

••• The Public Works Committee of the South Australian Parliament has recommended the expenditure of £3,122,000 to construct 235 miles of pipeline from Morgan, on the River Murray, to Whyalla, on Spencer's Gulf, in order to provide water for heavy industries there and to augment the supplies for industrial districts en route. The Broken Hill Proprietary, Australia's largest industrial corporation, is spending several million pounds at Whyalla to construct a blast furnace and shipyards, and also contemplates the erection of steel mills.

The South Australian government is introducing immediately the necessary legislation, the passage of which is assured.

Warner & Swasey Co. Votes Recapitalization

••• Stockholders of the Warner & Swasey Co., Cleveland, on Aug. 20, approved a plan of recapitalization increasing the company's authorized common stock from 300,000 shares of \$5.00 par value to 1,000,000 no par shares, and changing each present \$5.00 par share into three new shares without par value. Of the new common 276,680 shares are to be offered to the public through underwriters.

\$8,000,000 for Wright Engine Plant Equipment

••• Curtiss-Wright Corp. will erect a large plant at Lockland, Ohio, near Cincinnati, for manufacture of Wright Cyclone aircraft engines, Guy W. Vaughan, president, said this week following announcement of RFC loans to his company.

Curtiss-Wright will award contracts for more than \$8,000,000 worth of machine tool equipment. Construction of the plant will be started at the earliest possible moment. The site is a tract of 200 acres. The structure will provide more than a million square feet of floor space. Production will be geared to a thousand Cyclone engines a month, augmenting the present large-scale aircraft engine production of the Wright plants in the Paterson (N. J.) area.

Navy To Buy 117,638 Tons Of Steel in 6 Months

Washington

••• The Navy Department has issued a schedule calling for 117,638 tons of steel for stock, repairs and new ship construction for the six-month period of October, 1940-March, 1941. Bids will be received up to Sept. 6. The requirements in tons by grades is as follows: Sheets, 7384; strips, 527; bars, 6614; medium black and galvanized shapes, 13,738; high tensile black and galvanized shapes, 900; medium black and galvanized plates, 65,110 and high tensile black and galvanized plates, 23,365.

This purchase will mark the second one made by the Navy Department since inaugurating its policy of buying in on a six-month basis.

Army Asks Bids on Tank Cars; Grain Bins Sought

Washington

••• The office of the Chief of Engineers, War Department, will open bids on Sept. 9 for 145 to 645 10,000-gal. gasoline tank cars. Each car will require from 10 to 11 tons of steel.

The Division of Purchases, Sales and Traffic, Department of Agriculture, will receive bids on Aug. 29 for 3500 to 22,000 steel grain bins for storage of grain in West. Each bin will require about one ton of sheets.

The Bethlehem Steel Co. has been awarded 14,400 tons of plates and 170,000 tons of bolts for Panama Canal locks.

Bethlehem Steel Awards Coke Ovens Contract

••• Bethlehem Steel Corp. has awarded a contract to the Wilputte Coke Oven Corp., subsidiary of Semet-Solvay Co., division of Allied Chemical & Dye Corp., for a battery of coke ovens for its Lackawanna, New York, steel plant. The battery of ovens will consist of 76 under jet combination ovens having a coking capacity of 560,000 tons of coal per year, which is equivalent to approximately 32,000 tons of coke per month.

Government Contracts

Washington

••• Federal contracts for iron and steel products, as reported for the week ended Aug. 17 by the Labor Department's Public Contracts Division, totaled \$6,009,003. For the same period, contracts amounted to \$1,416,344 for non-ferrous metals and alloys and \$4,486,707 for machinery. Details follow:

Iron and Steel Products

Carnegie-Illinois Steel Corp., Denver, metalwork, \$26,845.
United Shoe Machinery Corp., Boston, guns, \$1,316,485.
General Electric Co., Federal and Marine Department Schenectady, howitzers, \$201,090.
The Variety Aircraft Corp., Dayton, Ohio, stand assemblies, \$177,500.
Crucible Steel Co. of America, New York, forgings, \$177,098.
National Forge & Ordnance Co., Irvine, Pa., forgings, \$65,500.
Struthers Wells-Titusville Corp., Titusville, Forge Division, Titusville, Pa., forgings, \$63,500.
Daniel Russell Boiler Works, Inc., Boston, float buoys, \$49,032.
Latrobe Electric Steel Co., New York City, steel, tool, \$56,605.
Latrobe Electric Steel Co., Latrobe, Pa.
The Upson-Walton Co., Belleville, N. J.
Bethlehem Steel Export Corp., New York City, fabricate plates, \$1,585,665.
Copperweld Steel Co., Glassport, Pa., reinforcing fabric, \$224,000.
American Forge Division of The American Brake Shoe & Foundry Co., Chicago, shell forgings, \$160,500.
Colt's Patent Fire Arms Mfg. Co., Hartford, parts for pistol, \$40,330.
Farrell-Birmingham Co., Inc., Ansonia, Conn., cast iron platens, \$39,600.
Crucible Steel Co. of America, New York, steel, tool, \$45,592.
Heppenstall Co., Pittsburgh, forgings, \$166,344.
Bethlehem Steel Co., Bethlehem, Pa., forgings, \$1,066,738.
The Hobart Mfg. Co., Troy, Ohio, telescope mounts, \$52,600.
Dayton Scale Division of The Hobart Mfg. Co., Dayton, Ohio.
Camden Forge Co., Camden, N. J., forgings, \$134,877.

Non-Ferrous Metals and Alloys

Aluminum Products Co., La Grange, Ill., pots, aluminum, \$25,776.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, hose, bronze, \$25,650.
Aluminum Goods Mfg. Co., Manitowoc, Wis., aluminum platters, \$48,197.
Aluminum Co. of America, Washington, D. C., alloy, aluminum, \$60,500.
The Riverside Metal Co., Riverside, N. J., bronze blanks, \$78,750.
International Minerals & Metals Corp., New York, electrolytic copper, \$53,645.
Revere Copper & Brass, Inc., Baltimore Division, Baltimore, cartridge discs, \$1,017,433.

Machinery

General Motors Corp., Cleveland Diesel Engine Division, Cleveland, propelling machinery, \$1,358,169.
Gleason Works, Rochester, N. Y., cutting machine, \$44,810.
Westinghouse Electric Mfg. Co., East Pittsburgh, Pa.
Monitor Controller Co., Baltimore.
The Lodge & Shipley Machine Tool Co., Cincinnati, engine lathes, \$25,509.
Cincinnati Milling Machines & Cincinnati Grinders, Inc., Cincinnati, milling machines, \$28,704.
The Warner & Swasey Co., Cleveland, turret lathes, \$41,487.
Pratt & Whitney Division, Niles-Bement-Pond Co., West Hartford, Conn., reproducing machines, \$37,941.
International Harvester Co., Washington, D. C., tractors, \$132,137.
International Harvester Co., Chicago.
Enterprise Tool & Gear Corp., Detroit, gears, \$52,012.
General Motors Corp., Cleveland Diesel Engine Division, Cleveland, propelling machinery, \$2,317,857.
The American Tool Works Co., Cincinnati, engine lathes, \$30,146.
The Bullard Co., Bridgeport, Conn., vertical lathes, \$26,142.
King Machine Tool Co., Cincinnati.

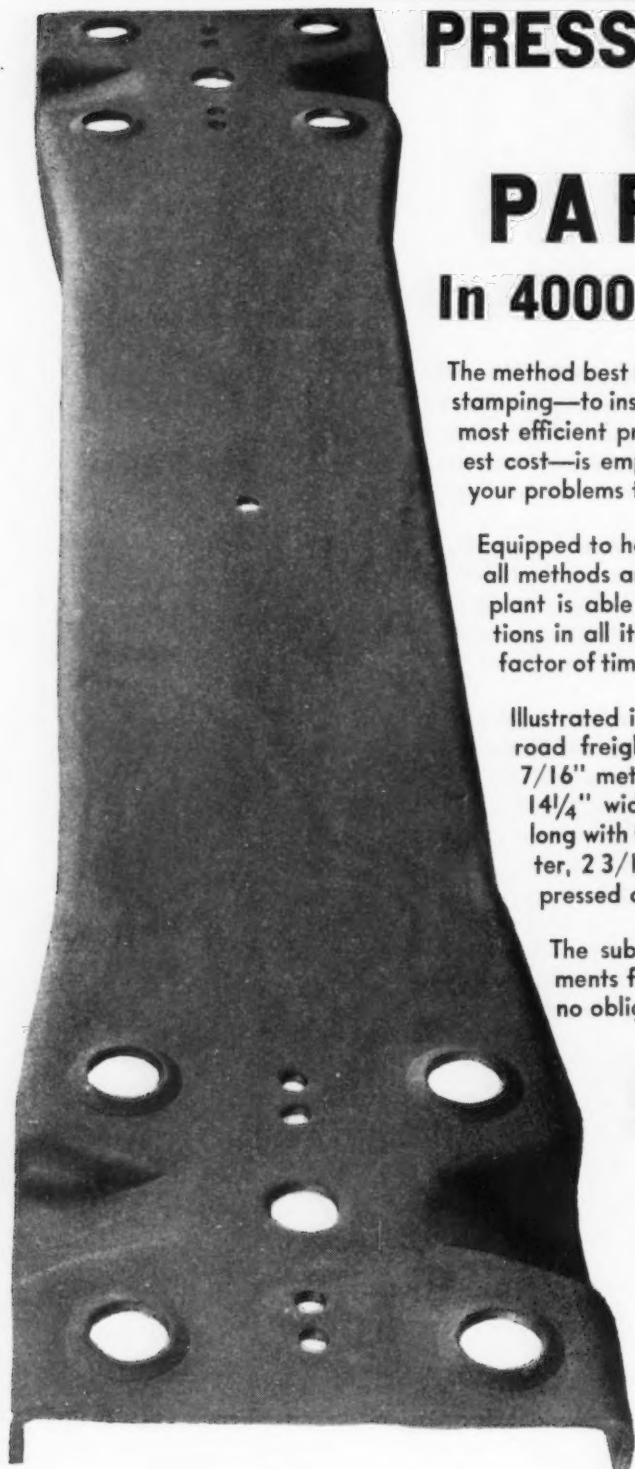
Navy Contracts

Robert Jacobs, Inc., City Island, N. Y., six harbor tugs, \$417,690.
Levingston Shipbuilding Co., Orange, Tex., 24 small boats, \$118,824.
Luders Marine Construction Co., Stamford, Conn., five harbor tugs, \$397,000.
Pennsylvania Forge Corp., Tacony, Philadelphia, steel forgings, \$88,730.
Fairbanks, Morse & Co., Chicago, diesel engine, \$144,661.

War Department awards

Waterbury Farrel Foundry & Machine Co., Waterbury, Conn., gaging machines, \$30,000.
Brown & Sharpe Mfg. Co., Providence, milling machines, \$32,879.

Weaver Mfg. Co., Springfield, Ill., trucks, \$41,720.
 The Cleveland Tractor Co., Cleveland, light tractors, \$39,672.
 Cincinnati Milling Machine & Cincinnati Grinders, Inc., Cincinnati, milling machines and tools, \$51,312.
 McCauley Steel Propeller Co., Dayton, Ohio, propeller blade assemblies, \$82,350.
 F. E. Mallery and Co., Inc., Indianapolis, bomb shackle releases, \$340,020.
 Walter Kidde & Co., Inc., New York, fire extinguishers, \$105,435.
 Curtiss Wright Corp., Curtiss Propeller Division, Clifton, N. J., propeller assemblies, \$128,685.
 Budd Wheel Co., Detroit, \$309,282.
 Bethlehem Steel Co., Bethlehem, Pa., \$26,344.
 Westclox, Division of General Time Instruments Corp., LaSalle, Ill., \$189,813.
 Seth Thomas Clocks, Division of General Time Instrument Co., Thomaston, Conn., \$103,347.
 Peco Mfg. Co., Philadelphia, \$234,000.



PRESSED COLD by PARISH In 4000 ton Press

The method best suited for each particular stamping—to insure most effective results, most efficient production and most modest cost—is employed when you present your problems to the Parish plant.

Equipped to handle all types of work in all methods and sizes of stamping, our plant is able to meet your specifications in all its elements, including the factor of time.

Illustrated is a Spring Plank for railroad freight car trucks. Made of 7/16" metal—16 5/8" wide at ends, 14 1/4" wide at center, and 93 1/4" long with flanges 3 3/8" high at center, 2 3/16" high at ends—it was pressed cold from heavy steel.

The submission of your requirements for review involves you in no obligation.

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PRESSED STEEL CO.

READING, PENNA.

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 F. Somers Peterson Co.,
 57 California St.,
 San Francisco, California



Plant Expansion Gains In Chicago District

Chicago

Plants in the Chicago district in the last 30 days have started additions costing more than \$3,000,000, according to a survey made by the Chicago Association of Commerce. Expansions of factories or manufacturing activities were announced in the past month by 40 companies, an industrial development which is said to have attained the highest point of the past two years, according to the association.

More than \$34,000,000 has been appropriated since the first of the year by companies in and around Chicago for new plants or additions to existing plants, and over 200 companies have announced building programs since Jan. 1.

The largest building program started during the period is the new factory at Harvey, Ill., for the Buda Co., which will cost around \$600,000.

Carbide Tool Sales Show Sharp Rise

• • • Continued rapid increase in the use of cemented carbide cutting tools to speed up machining of steel parts is indicated by July reports from Carboloy Co., Inc., major producer of metal for such tools. For that month, production of Carboloy metals for steel cutting totaled approximately four times that during July of the preceding year and was well in excess of June 1940, the previous peak month.

Increased use of carbides for machining cast iron and nonferrous metals is also again reported. July 1940 production for such purposes was 79 per cent ahead of the totals for the same month last year.

Contract for Destroyer Shipway Cleared by U. S.

Washington

• • • The Production Division of the National Defense Advisory Commission has cleared a contract for the construction of a double destroyer shipway at the Boston Navy Yard by the New England Foundation Co., Boston, at \$665,000. This brings the total of contracts cleared for award by the commission to \$2,101,110,017.



Announcement

H. A. Brassert & Company, Consulting Engineers for the steel industries, are moving their engineering and sales offices, located at present at Chicago, to Pittsburgh, and after August 15th will be located in the First National Bank Building there. The decision to move to Pittsburgh was prompted by the increasing concentration of steel company

headquarters in Pittsburgh. The company's executive offices are in the Lincoln Building, 60 East 42nd Street, New York, from which office their foreign business will be handled. An office will be retained at 310 South Michigan Avenue, Chicago.

The firm of H. A. Brassert & Company has served practically every iron and steel company in this country and many abroad. It has offices in New York, Chicago, London, Paris, Lima and Buenos Aires. Herman A. Brassert, President of the Company, states that the organization in these branch offices established new industries by the development of new sources of raw materials, constructing new plants, introducing in existing works modern practice and machinery throughout the world. Outside of the United States, this firm has done business in Australia, Austria, Belgium, Brazil, Canada, Chile, China, Colombia, Denmark, Egypt, England, France, Germany, Holland, India, Italy, Japan, Manchuria, Mexico, New Zealand, Norway, Peru, Poland, Scotland, Spain, Switzerland, Turkey, U.S.S.R., Yugoslavia, and others.

Recently this firm constructed and built three large iron and steel plants in Great Britain, the most prominent one being the steel works at Corby, located about 80 miles from London. This plant consumes high sulphur native ores, which were formerly considered unsuitable for the production of steel but are now being processed, using the new method developed by H. A. Brassert & Company. This development is, of course, at the present time of great value to England because it makes these plants independent of the importation of foreign iron ores. Plants were built in Germany and Austria employing similar methods. These plants, however, were not completed on account of the outbreak of the war, at which time Mr. Brassert dissociated himself from this undertaking.

H. A. BRASSERT and COMPANY

FIRST NATIONAL BANK BUILDING - - - - - PITTSBURGH
60 E. 42nd STREET - - - - - NEW YORK

Tax Confusion, Profit Limit Holds Up Rearming, Military Men Testify

Washington

••• High ranking naval and army officers in recent testimony released last week told the subcommittee of the Senate Committee on Appropriations that the national defense program is being delayed because of profit limitations on ship and airplane construction and uncertainties regarding taxes and amortization. They urged that the profit limitation be removed from legislation that has been enacted and that the pending excess profits tax-amortization legislation be expedited. Under legislation that has become law profits on ship and airplane construction is limited to 8 per cent, as contrasted with former limitations of 10 and 12 per cent, respectively, when awards are made under competitive bidding.

The excess profits tax-amortization bill would lift the restriction

on profits and provide for deduction of taxable profits over a five-year period for national defense plant construction. Senator McKellar, Democrat of Tennessee, and Senator Russell, Democrat of Georgia, opposed the lifting of profits limitation, despite the fact that the "profits" will be taken out of the excess profits tax legislation. Senator McKellar said that perhaps "we should use a little force" to make manufacturers supply needed defense material and Senator Russell said the President should be authorized to take over plants if necessary to obtain material. A provision authorizing the Navy Department to take over plants where agreement on prices could not be made with producer was rushed through Congress in the naval bill to expedite ship construction but Congress, suddenly awakening to the significance of

the provision, may repeal it. A repeal bill has been introduced in the House.

Rear Admiral W. R. Furlong, chief of the Bureau of Ordnance, urging the necessity of the provision for amortization, said that the United States Steel Corp. was going to put in about \$4,000,000 in a steel plant where it had a previous steel plant, and the bureau has to have the steel if the \$5,000,800,000 supplemental naval defense program is to be carried out.

Replying to a question by Senator McKellar, the admiral said that all the engineering work has been done on the proposed steel plant, necessary to meet the naval shipbuilding program, and that the steel company (said to be the Carnegie-Illinois Steel Corp.) is all ready to go ahead.

"We have analyzed and have cost accountants in these steel mills to determine the amount of profit that they make," the Admiral explained. "They do not make the 10 per cent we limit them to."

Senator Byrnes, Democrat of South Carolina, inquired whether corporations, "as someone said," are going to wait on the tax bill before they go ahead.

"They are perfectly willing to be taxed by a tax bill, and have it taken out that way," replied Admiral Furlong.

Senator McKellar inquired why companies, including the "United States Steel Co." have no reason for putting up plants when they are "principal contractors with the government for building or furnishing this armor plate and other material for the navy and they have many contracts with the army."

"The reason that they have to put up this extra plant is because the capacity of the United States Steel Co. now for rolled plates and armor plate of the special kind is 27,000 tons a year," said Admiral Furlong. We require for this program 68,000 tons. He said he was talking about special treatment steel and "mainly rolled armor that goes up to 3 in."

Special material for the navy is being turned out to the extent of the capacity, Admiral Furlong said, but with the increased navy shipbuilders say they could build ships four months more quickly

DEFENSE PROGRAM TO MANUFACTURERS INTERESTED IN MUNITIONS WORK

If you are working on United States Government orders for munitions of any kind, or are getting ready for the production of such items, you may be interested in the service which this organization has to offer.

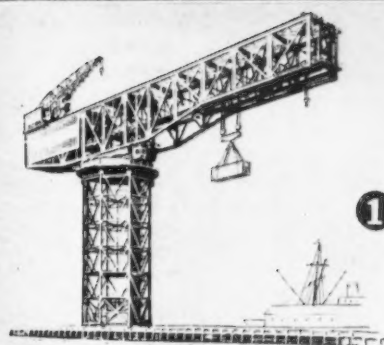
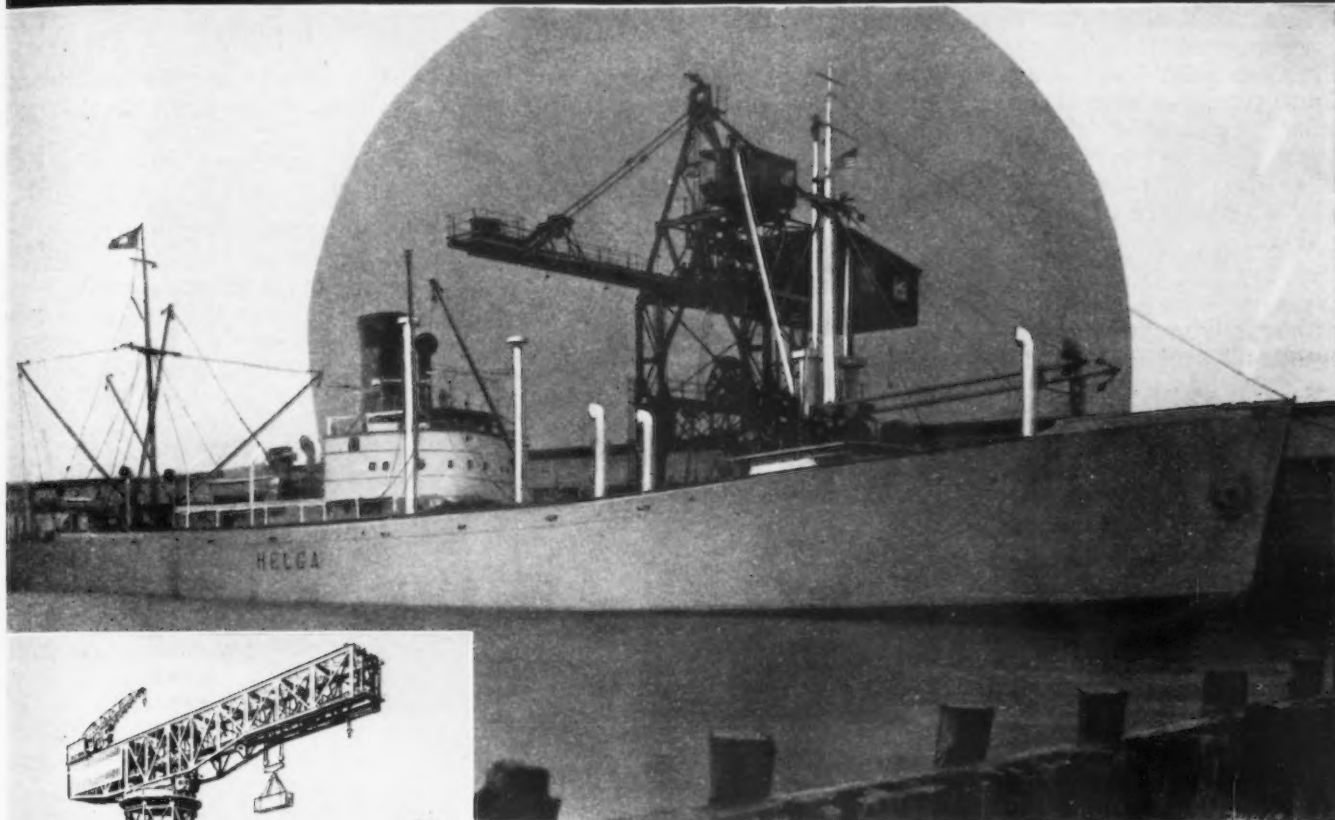
Our staff has had long experience in all kinds of munitions work and this technical experience is at your disposal.

We would work with your executives and engineers in a consulting capacity; study your present equipment and production set-up, and help you to organize and tool up your present equipment for maximum efficiency in line with the best modern practice.

We invite you to consult us without any obligation on your part.

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MATERIALS HANDLING



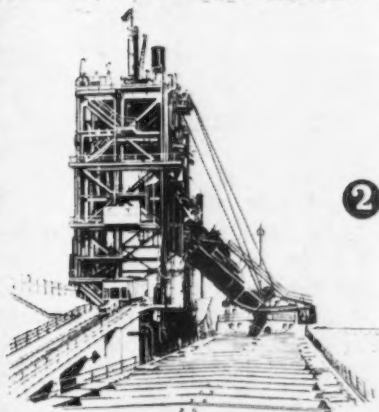
①

Cargo Dock Crane, Norfolk & Western Railway Company, Sewalls Point, Va. Designed and built by Heyl & Patterson.

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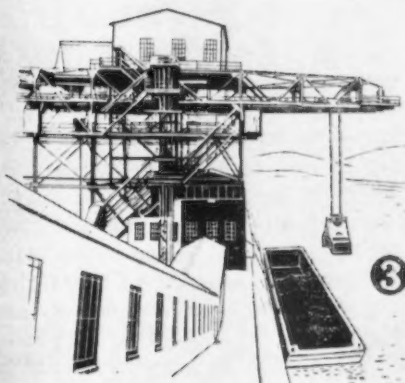
Today, at every point of transfer, the spotlight is on equipment that speeds the flow of materials.

Shown at the left are three outstanding rigs typical of the material handling equipment designed, fabricated and erected by Heyl & Patterson:



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1. HAMMERHEAD CRANE, 350 gross tons capacity, at seaboard.
2. CAR DUMPER, capable of handling a 120-ton loaded railroad car, at a lake port.
3. UNLOADING TOWER, removing 850 tons of coal per hour from river barge.



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As engineers, manufacturers and contractors, we are prepared to assume entire responsibility for jobs such as these—all the way from design to erection.

Let us know of your transfer problem. Our diversified experience with all types of equipment for handling bulk materials will help you to obtain a low-cost solution.

HEYL & PATTERSON INC.

50 WATER STREET

PITTSBURGH, PA.

than they now can be constructed if they could get the necessary steel.

Admiral Furlong said that the government is building a plant at Charleston, W. Va., for armor on funds that have been appropriated and that expansion is being made at the plant by the "United States Steel Co." (Carnegie-Illinois) to whom it has been leased.

"They are going to do the construction, and they are doing it, in the contracts we make with them, without any profit whatever on the building," said Admiral Furlong.

Senator McKellar inquired whether it would be cheaper to build government plants than to expand private plants.

"I do not know that it is cheaper, but it was a question of where we could get it done quickly enough, whether we would put that money into Bethlehem Steel or Midvale or Homestead or in a plant that we already owned, where we owned the land and had some buildings and could expand them, and it was probably cheaper and much quicker to get it turned out by putting some of it in a government plant," said Admiral Furlong. "But we are also at the same time putting facilities into those other steel companies that I spoke of for forged armor."

Admiral Furlong said the navy had no trouble getting material "until business picked up and the army, having increased appropriations, began to buy guns without the Vinson-Trammell Act (limiting profits). This and the foreign nations' and other government departments' buying without the operation of the Vinson-Trammell Act has caused business from the navy to be unattractive."

Maj. Gen. H. H. Arnold, chief of the Army Air Corps, said contracts for 4200 airplanes had been held up because industry "feels there are so many uncertainties, unknown quantities, that they have to contend with, that they find it difficult to arrive at a fair price for the airplanes."

(It was stated last Friday at the National Defense Advisory Commission that contracts for about 3000 army and navy planes have now been placed with manufacturers.)

Invasions Cut Reich's Critical Materials Shortage, British Say

• • • Domination of Norway, Poland, Belgium, France and Holland by Germany has practically ended Germany's dependency upon foreign sources for such vital raw materials as iron ore, bauxite and zinc, the *Metal Bulletin* of London says in a recent survey of Germany's war gains.

Supplies of other critical material such as molybdenum, nickel, cadmium, etc., were also greatly enlarged by the invasions, but are not yet sufficient to support Germany's war time economy. The problem of obtaining adequate copper and tin supplies also remains unsolved.

Capture of Norway served to add to Germany's supply of molybdenum and nickel, while Polish and Norwegian territories now are also sources of cadmium.

• • • Capture of smelting capacity in Europe does not necessarily mean a proportionate increase in actual supplies, the *Bulletin* points out, for many of these smelting plants are dependent upon imported ores. Examples of this are the copper and tin smelting plants of Belgium. Fair stocks of these two metals were seized by Germany in Belgium, Holland and France, but these will provide only temporary relief, it is felt, as long as the British blockade proves effective.

The *Bulletin* warns against overestimating the importance of the deficiency of copper and tin because of the many substitutes which Germany has developed. For example, copper is being widely replaced by aluminum and such substitutes as copper plated steel. Tin is being replaced by plastics, lead alloys, aluminum, etc. Obtaining adequate supplies of nickel, however, is believed to be Germany's biggest problem, but this may be lessened by the possibility that some of Finland's nickel ores may find their way to the Reich.

The capture of the French iron ore fields is described as "tragic." "But for this," the *Bulletin* says, "Germany would probably have been facing a steel famine this winter, when supplies of Swedish ore would have been virtually at a standstill owing to the freezing-up of the Baltic ports and the destruction of the Norwegian port of Narvik.

"Meanwhile, it would not be surprising if the Axis powers were to endeavor to strike southward into Africa, a storehouse of mineral treasure, with iron ore fields in the North and rich copper and tin deposits in the Belgian Congo. If the war is prolonged, we may see great sorties with a view to securing sources of supply of materials which are lacking in Germany and Italy."



• • • William L. Batt, president of SKF Industries, has been appointed as deputy commissioner of the Industrial Material Division of the National Defense Advisory Commission. His appointment was announced by Commissioner Edward R. Stettinius, Jr.

Mr. Batt has been with the National Defense Advisory Commission since it was organized, as division executive in charge of mining and mineral products for the Industrial Materials Division.

Each one labelled to show strength and hardness...

CERTIFIED GEARS



...cast in **NICKEL** alloyed iron

DEPENDABILITY is all-important to the designing or specifying engineer when selecting a gear and no gear is more dependable than the material from which it is made.

Braun Certified Gears are dependable. Made of a Nickel-chromium-molybdenum cast iron each gear is tested, labelled and guaranteed to provide a minimum tensile strength of 50,000 p.s.i. High hardness controlled within narrow limits reduces

abrasive wear, preserves tooth contours and assures longer service.

The improved properties of Nickel alloy cast irons enable Braun gears to more successfully withstand abnormal loadings and stresses. Furthermore the uniformly high strength of this material permits redesigning for smaller gears and more compact assemblies.

Consultation is invited on your problems involving Nickel.

Typical minimum properties of Nickel-chromium-molybdenum cast iron used by Braun Gear Corp.:

Minimum tensile strength, p.s.i.....	50,000
Compression strength, p.s.i.....	150,000
Shear strength, p.s.i.....	58,000
Torsional strength, p.s.i.....	67,000
Modulus of elasticity.....	20,000,000
Torsional modulus elasticity.....	7,500,000
Transverse strength, lbs.....	3,000
Transverse deflection, in. (test bar 1.2" diameter, 18" span)	.004
Brinell hardness.....	220
Weight per cubic inch, lbs.....	0.26

THE INTERNATIONAL NICKEL COMPANY, INC. 67 WALL STREET
NEW YORK, N. Y.

JESSOP WATER-HARDENING TOOL STEELS

LION

Produced Under RIGID METALLURGICAL CONTROL

WASHINGTON

E-25

RAPID
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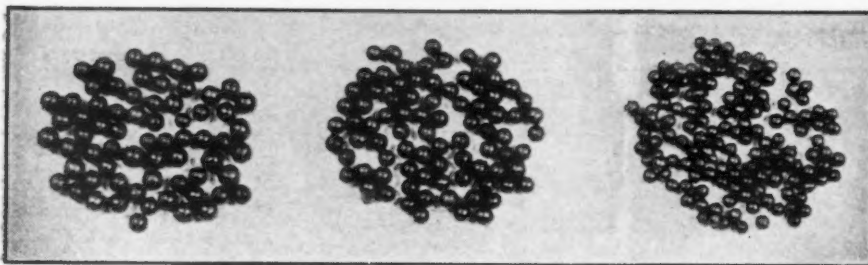
For tools requiring a hard, wear-resisting outer surface supported by a tough core, water-hardening tool steels are generally recommended. It is not enough, however, to specify "any" water-hardening steel. Tool shop supervisors with long experience in ordering tool steels have learned to specify "JESSOP"—because the extreme care exercised in the preparation of JESSOP STEELS guarantees high quality and uniformity. There are several brands of JESSOP Water-Hardening Tool Steels available for various requirements, including "WASHINGTON" and "LION" (straight carbon steels), "WASHINGTON SPECIAL E-25" (carbon-vanadium steel) and "RAPID FINISHING" (carbon-tungsten chrome steel). We will gladly advise which brand is best suited to your needs. Write JESSOP STEEL CO., 537 Green St., Washington, Pa. ESTABLISHED 1901.



"JESSOP Sets Standards in Fine Quality STEELS"

Jessop Steels of America

CARBON-HIGH SPEED-SPECIAL ALLOY
STAINLESS and COMPOSITE STEELS



HEAT-TREATED STEEL SHOT

We manufacture shot and grit for endurance

A shot or grit that will blast fast with a clean finish.

This is the only reason why so many operators are daily changing to our shot and grit, from Maine to California.

The unprecedented demand for our—

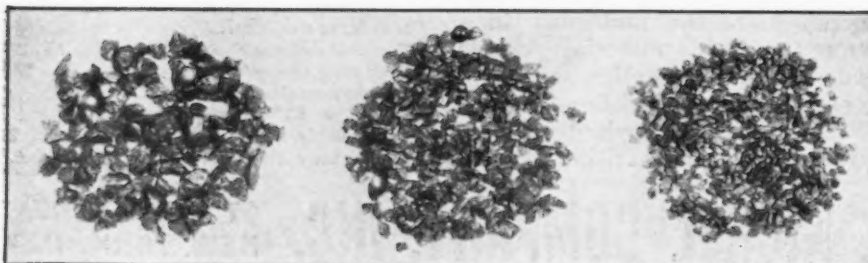
Heat-Treated Steel Shot and Heat-Treated Steel Grit

has enabled us to expand our production and maintain a quality that is more than satisfactory to our hundreds of customers all over the country.

HARRISON ABRASIVE CORPORATION

MANCHESTER, NEW HAMPSHIRE

HEAT-TREATED STEEL GRIT



Trade Notes . . .

U. S. Ordnance Engineers, Inc., 2200 Scranton Road, has acquired 100 per cent of the common stock of the Burgess Co., Inc., Beaver Falls, Pa. The Burgess Co. manufactures oil meters and steel specialties. Col. Byron C. Goss is now chairman of the board of the Burgess Co., which has removed its equipment fastening division to Cleveland and established headquarters at 2200 Scranton Road. The main Burgess plant will remain at Beaver Falls.

Connors Steel Co., manufacturer of reinforcing bars, column spirals, steel buildings and other products, has moved its general offices from the Empire Building in downtown Birmingham, Ala., to the plant at 5000 Powell Avenue in suburban Woodlawn. New office home of the company is a recently erected air-conditioned Connors steel building, containing approximately 6700 square feet of floor space.

Geometric Tool Co., New Haven, Conn., has appointed the Browning Tool & Supply Co., 225 West Georgia Street, Indianapolis, Ind., as exclusive representatives for Geometric products in the Indianapolis territory. This territory and southern Ohio were formerly handled by George Langen, Jr., of 1564 Wittekind Terrace, Cincinnati, who will sell Geometric products in southern Ohio and parts of Kentucky.

Hartley Wire Die Co., Waterbury, Conn., has moved to larger quarters at Thomaston, Conn., increasing floor space by approximately 15,000 sq. ft. The company, producer of Carboly dies for drawing, sizing and extruding purposes, recently celebrated its 90th anniversary, and is said to have been the first organization in this country to make diamond dies.

Plans for manufacture and sale of a newly developed "Speedee Ratch" wrench has been announced by Thomas Harry, Jr., and C. E. Burbank, of the Mechanics Engineering Co., Jackson, Mich. The wrench will be manufactured by the Beall Tool Division of Hubbard & Co., Pittsburgh, at its East Alton, Ill., plant. Henry H. Merriman, consulting engineer, Mechanics Engineering Co., is the inventor.

Kulka Iron & Metal Co., Alliance, Ohio, has acquired the real estate and plant of the Windsor Brick & Supply Co. in Akron, Ohio. The deal, which included 20 acres of land, a brick manufacturing plant, office building, rail siding and equipment, was closed at receiver's sale.

Bradshaw & Co., Pittsburgh, has been appointed general sales agent for the national distribution of the W-K-M Master scrubber for producing clean, dry steam, air or gas. The company will appoint agents in various key cities.

Cyril Bath & Co., East 70 Street and Machinery Avenue, Cleveland, national distributor of the Steelweld and Sturdybender lines of bending presses and bulldozers, celebrated its 25th anniversary Aug. 1, 1940.

Joseph P. Cattie & Bros., Philadelphia, has purchased a block of ground opposite the present plant for expansion, to do Navy work. The Cattie plant is said to be one of the largest job galvanizing plants in the United States.

Chain Belt Co. has moved manufacturing operations of its screw conveyor division from the Chicago plant to the West Milwaukee works.

Lewis B. Lindemuth, steel plant engineer, has moved his office to 140 Cedar Street, New York.

The Detroit Stamping Co. has moved into a new modern plant at 350 Midland Avenue, Detroit.

Jones Expected to Take Commerce Secretary Post

Washington

••• Federal Loan Administrator Jesse Jones, it is reported, will accept the cabinet post of Secretary of Commerce offered him by the President upon the resignation last week of Harry L. Hopkins. Mr. Jones, however, has made it clear that he will await his return to Washington to report to the President whether he will accept the position. He is a guest of Fred Fisher, Detroit automotive body builder, abroad a yacht in Little Traverse Bay. Hopkins resignation is expected to become effective Sept. 1.

Chile Gets Paper Machinery from Reich

Washington

••• The pump-grinding and paper-making machinery purchased by Chilean interests in Germany more than a year ago has arrived in Chile by way of Switzerland and New York following various diplomatic interventions and is now being installed in the new pulp and paper plant at Valdivia, says a report received from Consul Renwick S. McNiece, Valparaiso.

TNEC Monograph On Steel Almost Ready

Washington

••• The TNEC monograph on the iron and steel industry has been prepared by Dr. M. G. de Chazeau, and is being revised and edited prior to being sent to the Government Printing Office. It is expected to send the monograph to the printer this week but that it will be several weeks before it is available for distribution.

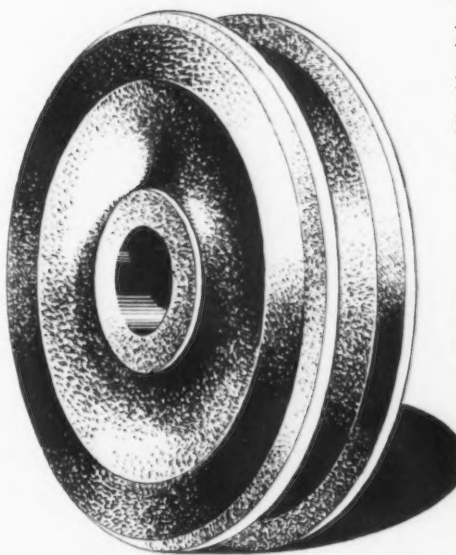
Details Held Back on Carnegie-Illinois Contract

Washington

••• The Navy Department declined to give out any details regarding its announcement that its Bureau of Ordnance has awarded a negotiated contract to the Carnegie-Illinois Steel Corp., Pittsburgh, for increased facilities at a cost of \$2,275,000.



CRANE WHEELS
of Wrought Steel
FOR LONG LIFE AND ECONOMY



Wrought steel crane wheels, as compared with cast wheels, have greater strength and toughness and adhesion to the rail. They insure a minimum of wear on the wheel and rail.

Standard's crane wheels reflect long experience in the manufacture of wrought steel products of all descriptions.

The quality built into every Standard wheel insures long life and economy.

CASTINGS • FORGINGS • WELDLESS RINGS • WROUGHT STEEL WHEELS

STANDARD STEEL WORKS

Division of THE BALDWIN LOCOMOTIVE WORKS
P H I L A D E L P H I A



Shortage of Tool Engineers And Skilled Mechanics Revealed

••• Final tabulations of technical and skilled labor requirements by U. S. industry, made by the American Society of Tool Engineers, reveal that earlier estimates were on the low side according to Ford R. Lamb, executive secretary. To take care of immediate needs, and for definitely planned expansions during the remainder of the year—excluding, however, potential expansions due to possible defense production requirements—metal-working plants in the U. S. need the following:

	For Immediate Production Requirements	For Definitely Planned Expansions	Totals
Tool engineers...	32,570	72,208	110,800
Tool and die makers	127,750	281,060	408,800
Skilled mechanics	408,816	332,160	741,000

The tabulation reveals that 53 per cent of all metal working plants have definite plans to increase productive capacity during the last half of 1940.

Bethlehem Will Pay 62.5c. Wage Minimum

••• Bethlehem Steel Co. has revised minimum wage rate to conform with Walsh-Healey law.

"Bethlehem Steel Co. announced today (Aug. 21) that, in view of the requirement of the Walsh-Healey Act that any company producing products of the iron and steel industry for the government must comply with the minimum wage determination for that industry made by the Secretary of Labor and in order to make its facilities fully available to help satisfy the anticipated heavy demands of the government for steel products for the National Defense Program, the company will guarantee that the minimum earnings of employees in its steel plants will average 62½c per hr.

"This guarantee will be effective from and after Sept. 1, 1940, and will apply to employees in those plants receiving the common labor rates or more, including those employed on commercial as well as on government work."

Analysis of the returns reveals that the shortage of skilled help is general throughout all major geographical industrial areas, though local conditions show considerable variation in the type of shortage involved. Following are comparisons in percentages of metal-working plants in the three major industrial regions:

Per Cent of Plants Needing:	New England	Middle Atlantic	East North Central
Tool engineers...	25	31	25
Tool and die men	57	62	51
Skilled mechanics	43	69	64
Per cent of plants planning expan- sions in 1940 ..	65	55	54

The underlying causes of the present shortage, as indicated by the survey are:

(1) Educational System has not kept pace with the machine age.

(2) Union Labor's restrictive attitude toward use of apprentices by industry.

(3) Slowing down and interruption of industrial training programs through depression years.

Brown Sheet Iron & Steel Out of Bankruptcy

••• Brown Sheet Iron & Steel Co., 964 to 1000 Berry Avenue, St. Paul, Minn., makers of steel oil barrels, tanks, stainless steel products, furnaces, and other sheet metal products since 1913, has been discharged from bankruptcy by Judge Gunnar H. Nordbye in Federal Court. This company, operating under Section 77B of the Bankruptcy Act for the past five years, has been reorganized, paying off all creditors. New officers are P. W. Casey,

Chairman of the Board

BOB HOPE, stage, screen and radio comedian, is now director and chairman of Hope Metal Products, Inc., Cleveland. His older brother, Ivor, is president and sales manager. The company will make steel doors and sheet metal products and do contract welding.

president and general manager, H. C. Klages, vice-president, and W. A. Morse, secretary-treasurer.

July Exports of Steel "Semi-Manufactures" Up

Washington

••• Exports of iron and steel "semi-manufactures" in July of the present year increased sharply to a value of \$32,501,000 from \$12,615,000 in the corresponding month of last year, according to the Department of Commerce's Division of Foreign Trade Statistics. For the seven months ended July, 1940, the volume rose to \$191,516,000 from \$81,962,000 in the first seven months of 1939. Iron and steel scrap exports in July were valued at \$5,459,000 compared with \$5,080,000 in July of last year. During the 1940 seven-month period they were valued at \$30,588,000 against \$31,444,000 in the corresponding 1939 period.

Exports of tin plate and tagger's tin in July, 1940, were valued at \$3,402,000, compared with \$2,317,000 in July, 1939. In the first seven months of 1940 exports were valued at \$34,348,000 compared with \$12,799,000 in the corresponding period of 1939.

Industrial machinery exports in July, 1940, rose to a value of \$31,094,000 from \$24,559,000 in July, 1939. For the first seven months of 1940 the value increased to \$239,424,000 from \$165,826,000 in the corresponding period of 1939. Exports of metal working machinery in July of the current year were valued at \$15,488,000 compared with \$9,699,000 in July of last year. In the first seven months of 1940 metal working machinery exports aggregated \$124,612,000 compared with \$65,384,000 in the corresponding period of 1939.

J. & L. Outlaw Mine Strike Continues

Pittsburgh

••• The Outlaw strike involving 4000 miners at Jones & Laughlin Steel Corp.'s captive mines was still in effect on Tuesday of this week with both company and union officials branding it a violation of the contract between the steel company and United Mine Workers.

Canadian July Pig Iron Output at New High, Plant Expansion Speeded

Toronto

••• Canada's iron and steel industry has stepped up production another notch in its efforts toward providing the sinews of war and output again has been sent to another high record. Statistics just released show iron and steel production for July at the highest rate in history, and the current rate is very close to the maximum of present facilities. However, plant enlargements are proceeding at a number of steel producing works, and these will come into operation late this year or early in 1941 and will give further impetus to this country's steel making facilities.

While steel making equipment has or is being increased, nothing has been done to date with regard to providing greater production facilities for pig iron and Canada's equipment in this direction consists only of 10 blast furnaces.

Pig iron production in July soared to a new top at 95,924 long tons, compared with 88,656 tons in June and 59,587 tons in July, 1939.

During the month of July two additional stacks were blown in, one at Algoma Steel Corp., Sault Ste. Marie, Ont., and one at Canadian Furnace Co., Port Colborne, Ont., which was down for relining. The nine furnaces blowing have production capacity of 93 per cent of all furnaces in Canada, with only one blown out. Stacks in blast are located as follows: Dominion Steel & Coal Corp., Sydney, N. S., three; Algoma Steel Corp., Sault Ste. Marie, Ont., three; Steel Co. of Canada, Ltd., Hamilton, Ont., two, and Canadian Furnace Co., Port Colborne, Ont., one.

Output of ferro alloys showed a decline for the month at 9257 tons against 10,128 tons in June and 6475 tons in July, 1939. For the seven months ending with July cumulative production of ferro alloys was 67,501 tons compared with 37,379 in the seven months of 1939.

Production of steel ingots and direct steel castings in July was 169,577 tons against 166,213 tons



S. P. BROOME, above, has been appointed special representative of Crucible Steel Co. of America to cooperate for that company with the National Defense Advisory Commission. He formerly was eastern sales manager of the Pittsburgh Crucible Steel Co., a subsidiary.

in June and compares with 111,149 tons for July, 1939. The month's total included 164,501 tons of ingots and 5076 tons of castings. For the seven months ending with July production made an all time record at 1,127,823 tons and compares with 691,290 tons for the corresponding seven months of 1939.

Industrial plant expansion in Canada is gaining. All the primary steel producing companies have completed or are engaged in large plant additions and the majority of the secondary plants that have secured war contracts of one type or another, are building large additions and also there are many plants under construction which will introduce new lines of manufacture to the large Canadian list.

Chief Source of Scrap Is Ordinary Junk

••• Next to "home" scrap which is produced and remelted by the steel and foundry industry in its normal manufacturing operations, the greatest source of scrap iron and steel is the toll taken by obsolescence, according to the 1940 Yearbook of the Institute of Scrap Iron & Steel Inc., New York, about to be issued.

In 1939, domestic consumption of scrap amounted to 32,400,000 gross tons and exports 3,500,000 tons, a grand total of 35,900,000 tons to be accounted for.

From the dismantling of old equipment, the replacing of rails, the railroads marketed 3,500,000 tons. In the process of converting finished steel into ships, railroad equipment, automobiles and other consumer goods, the production of new scrap in metal-making plants is estimated at 3,250,000 tons. Junking of old automobiles yielded about 2,675,000 tons. Public utilities sold about 300,000 tons and ship breakers 75,000 tons.

Unaccounted for by the Institute estimate is about 7,700,000 tons, which originated in the collections by peddlers, the dismantling of railroad branch lines, wrecking of buildings, and the general wear and tear on commodities made from iron and steel.

Total value of all scrap in 1939 was slightly over \$600,000,000.

Faddis-Hill Bill Passed by House

Washington

••• The House last Thursday passed the Faddis-Hill Bill authorizing the President to requisition machine tools and other essential national defense materials which have been ordered in this country by foreign countries but are held at docks or in the hands of the manufacturers. The House amended the bill so as to terminate on June 30, 1942, the authority it granted the President.

Representative J. Joseph Smith, Democrat of Connecticut, who assumed direction of the bill in the House, said that the amount of material subject to requisition up to the present time would probably be in the neighborhood of several hundred thousand dollars.

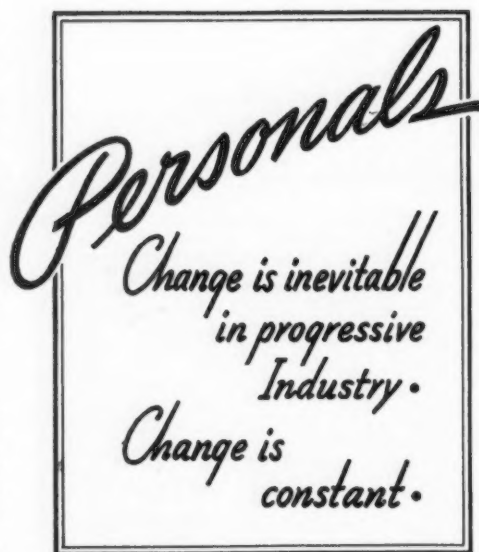
• **James S. Dickie** has been elected vice president in charge of engineering of the American Shipbuilding Co., Cleveland. Mr. Dickie, who has been with the company for 24 years, had been consulting naval architect in charge of estimating. He was born in Scotland.

• **Robert H. Perry**, formerly with Brown Instrument Co., is now sales engineer for the Ajax Electric Co., Inc., in Buffalo.

• **H. L. Nicholson**, who has been with the Westinghouse Air Brake Co. for 37 years, and served as Works Manager since 1919, has been promoted to director of factory operations. **W. C. Landis**, after 25 years service with the company and assistant works manager since 1930, succeeds Mr. Nicholson as works manager. **A. B. Fox**, who entered the employ of the company 35 years ago, and has served as superintendent of the traction brake division since 1920, was appointed assistant works manager, succeeding Mr. Landis.

• **Dave Neill** has been made factory service manager of the Automobile Division, The Crosley Corp. Mr. Neill's experience in the automobile business goes back to 1915 when he was in charge of engine experimental and development work for the Daimler Motor Company of England, and later with the Austin Motor Company of England. In 1922 he joined the Lincoln Division of the Ford Motor Company. For the following 14 years he acted in various executive capacities, both in the Lincoln and Ford divisions in manufacturing, production, sales and service. Previous to coming with Crosley, Mr. Neill was with the Studebaker Corporation in charge of sales for Kansas and Missouri, with headquarters at Kansas City, Mo.

R. M. Pierce receives the post of district manager of the automobile division, the Crosley Corp., for the New England states. For 11 years Mr. Pierce was in the commercial car division of General Motors in different sales capacities. From 1929 to 1938 he was with the Chrysler Corporation, serving as wholesale representative and fleet sales representative in both New York and Detroit. Before coming to Crosley he was regional manager for the American Bantam Car Company, with headquarters in Boston.



• **Carroll F. Brown** has been appointed superintendent of industrial relations at the Duquesne works of Carnegie-Illinois Steel Corp., Pittsburgh. He was first employed at Farrell works of the former American Sheet & Tin Plate Co. in 1918. Mr. Brown joined the industrial relations department at Farrell works in 1936 and has been assistant to vice president in charge of industrial relations since 1939.

• **Donald G. Millar**, heretofore president of the Greenfield Tap &



HERMAN J. HOFMANN, whose appointment as superintendent of open hearth of the Lukens Steel Co., was announced in these columns last week.

Die Corp., Greenfield, Mass., has been elected chairman of the board replacing **Col. Frederick H. Payne** who resigned to devote his entire time to national defense work as chief of the Hartford Ordnance District.

Replacing Mr. Miller is **Howard M. Hubbard** who has resigned as secretary-treasurer of Harris-Seybold-Potter Co., Cleveland, to take his new post with the Greenfield company.

Other personnel changes include the resignation of **Francis A. Smith**, vice-president and general manager of the Greenfield Tap & Die Corp., who has been associated with the company in various executive capacities for over 20 years.



HOWARD M. HUBBARD, president and general manager, Greenfield Tap & Die Co.

• **L. E. MacFadyen** has been appointed superintendent of the High Bridge, N. J., plant of the Taylor-Wharton Iron & Steel Co. Mr. MacFadyen has been associated with Taylor-Wharton since 1922, serving for many years in the sales engineering divisions at both Scranton and Philadelphia; and for the past three years with the manufacturing division at High Bridge. A graduate of Alfred University, Mr. MacFadyen was employed, prior to his association with Taylor-Wharton, as a chemist at the Watervliet Arsenal, and in the General Electric research laboratories at Schenectady.

• **Elwood G. Stewart**, who has been acting traffic manager of Lukens Steel Co., Coatesville, Pa., since November, 1939, has been appointed traffic manager of the concern. Mr. Stewart was born in New York, N. Y., in April, 1907, and was educated in the public schools of Atlantic City and Camden, N. J. In 1923, he joined the accounting department of the Pennsylvania Railroad where he continued until June, 1931, when



ELWOOD G. STEWART, traffic manager, Lukens Steel Co.

he entered the traffic department of Lukens. He was promoted to assistant traffic manager in May, 1935.

• **John H. Stapleton**, heretofore assistant to vice-president in charge of sales, Carnegie-Illinois Steel Co., has been appointed assistant manager of sales for the New York district. Mr. Stapleton has been associated with subsidiaries of United States Steel Corp. since 1917. Mr. Stapleton attended the University of Cincinnati, his native city, and was first employed in the sales department of the for-
fields and at Columbus and mer Carnegie Steel Co., in 1917. He served the company as a salesman in the Kentucky coal fields and at Columbus and Youngstown before he was appointed assistant to the manager of sales at Chicago. Mr. Stapleton became assistant to vice-president in charge of sales in February, 1938.



R. VOLBRECHT, appointed to the New York merchandising sales staff, Cutler-Hammer, Inc.

• **R. Volbrecht** has been appointed to the New York merchandising sales staff of Cutler-Hammer, Inc. Mr. Volbrecht joined Cutler-Hammer upon graduation from the University of Wisconsin where he received a bachelor of science degree in electrical engineering. He spent a number of years at the company's main plant at Milwaukee in the engineering and mer-



JOHN H. STAPLETON, appointed assistant manager of sales for the New York district, Carnegie-Illinois Steel Co.

chandising sales departments and more recently was with the motor control sales division of the Philadelphia district office.

• **J. Edward Trainer**, general production manager of all Firestone Tire & Rubber Co. plants, has been elected vice president. He will continue his duties as general production manager. He has been with Firestone since January, 1939.

• **Howard M. Zoerb**, sales engineer with the Nordberg Mfg. Co., Milwaukee, recently returned from an extensive South American tour, gave the Milwaukee Central Lions Club an outline of what our country may expect in trade from there after the present war.

• **Morton B. Duggan**, formerly chief rate expert in the passenger department of the Illinois Central System has been made chairman of the Southern Passenger Association with headquarters in Atlanta. He is a past president of the American Association of Passenger Rate Men.

• **George Satterthwaite** has resigned as executive secretary of the Cold Finished Steel Bar Institute to become associated with the Midvale Co. of Philadelphia, with whom he previously was connected for many years. As yet his successor in the Institute has not been announced.

• **Palmer B. Stickney** has joined the technical staff of Battelle Memorial Institute to study the kinetics of the thermal decomposition of hydrocarbons in the division of chemistry. He is a graduate of Ohio State University and has had two years of graduate work at the University of Cincinnati.

• **V. E. Carlson** has been named head of the engineering division of Eureka Vacuum Cleaner Co., Detroit, it has been announced by President H. W. Burritt.

• **Charles R. Hook**, president of American Rolling Mills Co., on Friday, Aug. 16, addressed a luncheon meeting of zone sales managers of the Briggs Mfg. Co., plumbingware division, at the Detroit Athletic Club. Mr. Hook was introduced by **F. B. Henderson**, general manager of the plumbingware division. Also present were **R. B. Jenkins**, sales manager of the plumbingware division and **G. F.**

Ahlbrandt, assistant vice president of American Rolling Mills Co.

• **Harold J. Dawe**, recently awarded his Ph.D. in chemistry, University of Michigan, has been added to the staff of the Acheson Colloids Corp., Port Huron, Mich., where he will devote his time to investigative work on colloids. Dr. Dawe was designee for the Acheson Colloids Corp. Fellowship Grant in colloid chemistry at the University of Michigan. His research work for his doctorate was directed by Prof. F. E. Bartell, international authority.

Obituary

• **Stanley P. Rockwell**, Hartford metallurgist, was killed Aug. 11 when his yacht exploded while anchored in the Connecticut River. He was the inventor of the Rockwell Hardness Test which has become a world standard for determining the hardness of metals.

• **Tyler W. Carlisle**, 54, president, Strong-Carlisle & Hammond Co., Cleveland, died Aug. 14 at Lakeside Hospital in Cleveland after a four weeks' illness. Mr. Carlisle, for many years prominently identified with the development of Cleveland, was born in Cleveland in 1885. He attended Massachusetts Institute of Technology where he was graduated with a B.S. degree in 1909. After three years of apprenticeship with a manufacturer at Providence, R. I., he entered the employ of the Strong-Carlisle & Hammond Co. which his father, the late Robert H. Carlisle, helped found in 1887. In 1916 he was made sales manager and a director of the company but soon began World War service as a major in the Ordnance Department in Washington. In 1919 he returned to the company as general sales manager and in 1926 was elected vice-president. He had been president of the company since May, 1937. Mr. Carlisle was a director of the Clark Mfg. Co. and the Hammond Mfg. Co.

• **Lynn J. Hammond**, 76, chairman of the board of Strong-Carlisle & Hammond Co., Cleveland, died suddenly Aug. 22 at his summer home near Cleveland. His death came just eight days after that of Tyler W. Carlisle, president of the Strong-Carlisle & Hammond Co.

Although Mr. Hammond had recently been ill with pneumonia, his death was unexpected. He leaves no immediate survivors. Mr. Hammond was the son of Horace J. Hammond, a paymaster for the old Cleveland Rolling Mill Co., who died in 1874. Five years later the son went to work for the company as a clerk in the same department where his father preceded him. He remained in the employ of the rolling mill until April, 1887, when he became the first employee of the newly formed Strong-Carlisle & Turney Co., later Strong-Carlisle & Hammond. In succeeding years Mr. Hammond became a general office worker, sales manager, general manager and president. He had been chairman of the board about 10 years. In addition to his association with Strong-Carlisle & Hammond, Mr. Hammond was treasurer of the Clark Manufacturing Co. and treasurer of the Hammond Manufacturing Co.

• **Edward Keyes Browne**, managing editor of the American Metal Market, died Aug. 17 at his home in Florham Park, N. J., after an illness of two months. He was 56 years old.

• **Charles F. Drew**, secretary and treasurer of the Rust Engineering Co., Pittsburgh, died Aug. 4.

• **Frank W. Dana**, president, Patent Novelty Co., Fulton, Ill., died Aug. 16.

• **William L. Fewsmith**, manager of publicity and advertising for Robins Conveying Belt Co., Passaic, N. J., died after a brief illness while on vacation at Port Carling, Ont., Aug. 15, at the age of 61. Mr. Fewsmith joined the Robins Conveying Belt Co. in 1913 as a civil engineer and had been continuously employed both in the

capacity of civil and mechanical engineer until 1924 when he was appointed head of the publicity and advertising department. He held membership in the Advertising Club of New York, National Industrial Advertisers Association, and in both the American Societies of Civil and Mechanical Engineers.

• **Nelson L. Fortin**, aged 51, district manager for Milwaukee of the Revere Copper & Brass Co., died in a Milwaukee hospital Aug. 10 after a short illness. He was active in the naval reserve and prominent in Milwaukee military and fraternal circles.

• **Charles W. Matheson**, 64 years old, an outstanding figure in the automobile business since 1913, was killed in an automobile accident near Broadhead, Wis., earlier in the week. Mr. Matheson had been with Dodge Bros., Oakland Motor Car Co., Kelvinator Corp., Chrysler Corp., and Reo Motor Car Co. He was president and general manager of the latter firm at one time, having been chosen to head the Reo staff in 1939. At the time of his death he was with Graham Paige Motors Corp.

• **Andrew J. Coon**, retired personnel manager for the Studebaker Corp., South Bend, Ind., died at his home in Detroit, Aug. 7.

Lester Page Breckenridge, engineer, inventor and professor, died at Mount Philo, Vt., Aug. 22. Mr. Breckenridge was born in Meriden, Conn., in 1858; graduated from Sheffield scientific school of Yale University in 1881; taught mechanical engineering at Lehigh University and Michigan Agricultural College until 1909; then returned to Yale as professor of mechanical engineering. Since retiring in 1923 he lived at Mount Philo. He invented automatic recording machinery; was chairman of the advisory board for the super-power survey, and a member of the world power conference.

John Goss, president of the J. & E. Goss Loom Reed Mfg. Co., died suddenly at his summer home at Oak Bluffs, Mass., Aug. 23. He was born in Manchester, England, 80 years ago.

Metal Working Activity

. . . Latest Data Assembled by The Iron Age

From Recognized Sources. In Net Tons.

	July 1940	June 1940	July 1939	7 Months 1940	7 Months 1939
Steel Ingots:					
Monthly output ^a	5,595,070	5,532,910	3,564,827	34,273,194	24,523,550
Average weekly output ^a	1,265,853	1,289,723	806,522	1,126,296	809,625
Per cent of capacity ^a	83.40	89.47	52.74	74.20	53.09
Pig Iron:					
Monthly output ^b	4,053,945	3,818,897	2,639,022	25,137,545	16,664,075
Raw Materials:					
Coke output ^c	4,842,891	4,525,526	3,401,200	31,182,331	21,935,300
Lake Ore consumed ^d	6,153,236	5,838,223	3,520,537	36,765,822	22,527,930
Scrap Iron consumed ^e	3,949,120	3,899,840	2,516,640	24,346,560	17,316,320
Castings:					
Malleable, orders ^f		36,503	29,892	218,425	223,154
Steel, orders ^f		59,661	34,804	272,006	264,960
Finished Steel:					
Trackwork shipments ^a	6,063	6,075	5,330	27,068	25,639
Fabricated shape orders ^f		103,111	110,675	600,474	776,922
Fabricated plate orders ^f		48,639	31,364	220,323	208,401
U. S. Steel Corp. shipments ^g	1,296,887	1,209,684	745,364	7,585,285	5,583,768
Fabricated Products:					
Automobile production ^h	225,000**	350,000**	209,359	2,658,892**	2,171,348
Steel furniture shipments ^g		\$2,159,626	\$1,566,978	\$13,222,382	\$12,176,995
Steel boiler orders ^g (sq. ft.)		1,740,127	772,094	5,537,575	6,011,187
Locomotives ordered ⁱ	51	31	4	236	156
Freight cars ordered ⁱ	5,846	4,235	0	16,431	9,077
Machine tool index ^j	88.3	92.3	65.8	92.3	60.5††
Foundry equipment index ^k	194.4	164.9	*	157.4	*
Gear sales index ^l	141.0	129.0	89.0	126.0††	92.0††
Non-Ferrous Metals: (U. S. only)					
Lead shipments ^l		49,904	42,636	268,723	275,042
Lead stocks ^l		55,343	124,017		
Zinc shipments ^m	57,661	53,935	43,128	371,444	288,418
Zinc stocks ^m	59,510	65,227	131,782		
Tin deliveries ⁿ (gross tons)	8,204	10,332	5,908	64,886	39,508
Refined copper deliveries ^o	71,226	61,716	59,681	490,093	357,092
Refined copper stocks ^o	215,823	199,586	316,543		
Exports:					
Total iron and steel ^p		1,048,373	575,304	4,761,925	3,612,998
All rolled and finished steel ^p		351,550	148,596	1,998,537	1,025,212
Semi-finished steel ^p		285,884	19,006	865,685	98,540
Scrap ^p		356,573	391,416	1,658,838	2,389,297
Imports:					
Total iron and steel ^p		6,166	34,553	44,854	232,786
Pig iron ^p		720	6,932	6,468	24,688
All rolled and finished steel ^p		1,117	16,172	11,135	134,232

Data in italics are six months' totals.

Source of data: ^a American Iron and Steel Institute; ^b THE IRON AGE; ^c Bureau of Mines; ^d Lake Superior Iron Ore Association; ^e Bureau of the Census; ^f American Institute of Steel Construction; ^g United States Steel Corp.; ^h Preliminary estimates by THE IRON AGE—Final figures from Bureau of the Census, U. S. only; ⁱ Railway Age; ^j National Machine Tool Builders Association; ^k Foundry Equipment Manufacturers Association; ^l American Bureau of Metal Statistics; ^m American Zinc Institute; ⁿ New York Commodity Exchange; ^o Copper Institute; ^p Department of Commerce; ^q Institute of Scrap Iron and Steel; ^r American Gear Manufacturers Association.

†Six months' average. ††Seven months' average. *Not available. **Estimate.

The Iron Age Comparison of Prices

Advances Over Past Week in Heavy Type; Declines in Italics

	Aug. 27 1940	Aug. 22 1940	July 30 1940	Aug. 29 1939		Aug. 27 1940	Aug. 22 1940	July 30 1940	Aug. 29 1939
Flat Rolled Steel: (Cents Per Lb.)					Pig Iron: (Per Gross Ton)				
Hot rolled sheets	2.10	2.10	2.10	2.00	No. 2 fdy., Philadelphia	\$24.84	\$24.84	\$24.84	\$22.84
Cold rolled sheets	3.05	3.05	3.05	3.05	No. 2, Valley furnace	23.00	23.00	23.00	21.00
Galvanized sheets (24 ga.)	3.50	3.50	3.50	3.50	No. 2, Southern Cin'ti	23.06	23.06	23.06	21.06
Hot rolled strip	2.10	2.10	2.10	2.00	No. 2, Birmingham	19.38	19.38	19.38	17.38
Cold rolled strip	2.80	2.80	2.80	2.80	No. 2, foundry, Chicago†	23.00	23.00	23.00	21.00
Plates	2.10	2.10	2.10	2.10	Basic, del'd eastern, Pa.	24.34	24.34	24.34	22.34
Tin and Terne Plates: (Dollars Per Base Box)					Basic, Valley furnace	22.50	22.50	22.50	20.50
Tin plate	\$5.00	\$5.00	\$5.00	\$5.00	Malleable, Chicago†	23.00	23.00	23.00	21.00
Manufacturing ternes	4.30	4.30	4.30	4.30	Malleable, Valley	23.00	23.00	23.00	21.00
Bars and Shapes: (Cents Per Lb.)					L. S. charcoal, Chicago	30.34	30.34	30.34	28.34
Merchant bars	2.15	2.15	2.15	2.15	Ferromanganese‡	120.00	120.00	120.00	80.00
Cold finished bars	2.65	2.65	2.65	2.65	†The switching charge for delivery to foundries in the Chi- cago district is 60c. per ton. ‡For carlots at seaboard.				
Alloy bars	2.70	2.70	2.70	2.70	Scrap: (Per Gross Ton)				
Structural shapes	2.10	2.10	2.10	2.10	Heavy melting steel, P'gh	\$18.75	\$18.75	\$18.50	\$16.25
Wire and Wire Products: (Cents per Lb.)					Heavy melting steel, Phila.	20.00	19.75	18.75	16.75
Plain wire	2.60	2.60	2.60	2.60	Heavy melt'g steel, Ch'go	18.50	18.50	17.25	13.875
Wire nails	2.55	2.55	2.55	2.40	Carwheels, Chicago	18.75	18.75	19.00	12.75
Rails: (Dollars Per Gross Ton)					Carwheels, Philadelphia	21.25	21.25	20.75	16.25
Heavy rails	\$40.00	\$40.00	\$40.00	\$40.00	No. 1 cast, Pittsburgh	19.75	19.75	19.75	16.00
Light rails	40.00	40.00	40.00	40.00	No. 1 cast, Philadelphia	22.25	21.75	21.25	16.75
Semi-Finished Steel: (Dollars Per Gross Ton)					No. 1 cast, Ch'go (net ton)	17.25	16.75	16.75	12.75
Rerolling billets	\$34.00	\$34.00	\$34.00	\$34.00	Coke, Connellsville: (Per Net Ton at Oven)				
Sheet bars	34.00	34.00	34.00	34.00	Furnace coke, prompt	\$4.75	\$4.75	\$4.25	\$3.75
Slabs	34.00	34.00	34.00	34.00	Foundry coke, prompt	5.25	5.25	5.25	4.75
Forging billets	40.00	40.00	40.00	40.00	Non-Ferrous Metals: (Cents per Lb. to Large Buyers)				
Wire Rods and Skelp: (Cents Per Lb.)					Copper, electro., Conn.*	11.00	11.00	11.50	10.50
Wire rods	2.00	2.00	2.00	1.92	Copper, Lake, New York	11.00	11.00	11.50	10.50
Skelp (grv'd)	1.90	1.90	1.90	1.90	Tin (Straits), New York	50.625	51.375	52.50	49.125
					Zinc, East St. Louis	6.50	6.50	6.25	4.75
					Lead, St. Louis	4.75	4.60	4.85	4.90
					Antimony (Asiatic), N. Y.	16.50	16.50	16.50	14.00
					*Mine producers only.				

The various basing points for finished and semi-finished steel are listed in the detailed price tables, pages 90 to 96 herein. On export business there are frequent variations from the above prices. Also in domestic business, there is at times a range of prices on various products, as shown in our detailed price tables.

Composite Prices . .

FINISHED STEEL				PIG IRON				SCRAP STEEL			
Aug. 20, 1940	2.261c.	a Lb.	.....	\$22.61	a Gross	Ton.....	.....	\$19.08	a Gross	Ton.....	.....
One week ago	2.261c.	a Lb.	.....	\$22.61	a Gross	Ton.....	.....	\$19.00	a Gross	Ton.....	.....
One month ago	2.261c.	a Lb.	.....	\$22.61	a Gross	Ton.....	.....	\$18.17	a Gross	Ton.....	.....
One year ago	2.236c.	a Lb.	.....	\$20.61	a Gross	Ton.....	.....	\$15.62	a Gross	Ton.....	.....
	High	Low		High	Low			High	Low		
1940	2.261c., Jan. 2	2.211c., Apr. 16		.....	.....			\$19.92, June 18	\$16.04, Apr. 9		
1939	2.286c., Jan. 3	2.236c., May 16		\$22.61, Sept. 19	\$20.61, Sept. 12			22.50, Oct. 3	14.08, May 16		
1938	2.512c., May 17	2.211c., Oct. 18		23.25, June 21	19.61, July 6			15.00, Nov. 22	11.00, June 7		
1937	2.512c., Mar. 9	2.249c., Jan. 4		23.25, Mar. 9	20.25, Feb. 16			21.92, Mar. 30	12.92, Nov. 10		
1936	2.249c., Dec. 28	2.016c., Mar. 10		19.73, Nov. 24	18.73, Aug. 11			17.75, Dec. 21	12.67, June 9		
1935	2.062c., Oct. 1	2.056c., Jan. 8		18.84, Nov. 5	17.83, May 14			13.42, Dec. 10	10.33, Apr. 29		
1934	2.118c., Apr. 24	1.945c., Jan. 2		17.90, May 1	16.90, Jan. 27			13.00, Mar. 13	9.50, Sept. 25		
1933	1.953c., Oct. 3	1.792c., May 2		16.90, Dec. 5	13.56, Jan. 3			12.25, Aug. 8	6.75, Jan. 3		
1932	1.915c., Sept. 6	1.870c., Mar. 15		14.81, Jan. 5	13.56, Dec. 6			8.50, Jan. 12	6.43, July 5		
1931	1.981c., Jan. 13	1.883c., Dec. 29		15.90, Jan. 6	14.79, Dec. 15			11.33, Jan. 6	8.50, Dec. 29		
1930	2.192c., Jan. 7	1.962c., Dec. 9		18.21, Jan. 7	15.90, Dec. 16			15.00, Feb. 18	11.25, Dec. 9		
1929	2.236c., May 28	2.192c., Oct. 29		18.71, May 14	18.21, Dec. 17			17.58, Jan. 29	14.08, Dec. 3		
Based on steel bars, beams, tank plates, wire, rails, black pipe, sheets and hot-rolled strip. These products represent 85 per cent of the United States output.				Based on average for basic iron at Valley furnace and foundry iron at Chicago, Philadelphia, Buffalo, Valley and Southern iron at Cincinnati.				Based on No. 1 heavy melting steel scrap quotations to consumers at Pittsburgh, Philadelphia and Chicago.			

Summary of the Week

STEEL plant operations in the United States this week advanced to 91½ per cent of capacity, a point above last week's rate and a new high mark for 1940. Gains of three points to 87 per cent at Pittsburgh, a half point to 98½ per cent at Chicago, three points to 89 per cent at Cleveland, four and a half points at Detroit and three points at St. Louis accounted for the upturn in the national average.

Accompanying the gain in ingot production came the expected reaffirmation of base prices on major steel products for delivery up to and including Dec. 31. Carnegie-Illinois Steel Corp. reaffirmed present base prices on hot rolled carbon steel, semi-finished material, bars, structural shapes, plates, sheet steel piling, hot and cold rolled sheets, hot rolled strip, and standard rails and on all hot rolled alloy steel items except alloy plates. Jones & Laughlin Steel Corp. has also reaffirmed quotations on all hot rolled steel products, including wire rods, skelp and other hot rolled products not specifically mentioned in the Carnegie announcement. American Steel & Wire has reestablished present prices on cold rolled strip and commodity cold rolled strip.

Because of increased demand for hot rolled alloy plates, a base price of 3.25c. per lb., f.o.b. Pittsburgh and Chicago, was set up for this product, which is important in the national defense program. A complete new list of extras is expected to be issued covering alloy plates, some changes are likely to be made soon in regular alloy extras covering hot rolled alloy semi-finished and finished products, and some adjustments may be made in the hot rolled carbon plate extra card. Pig iron producers may not reaffirm prices for fourth quarter delivery, but will accept fourth quarter business at present prices until further notice.

INCOMING steel business shows further slight improvement and some major producers will have booked a greater tonnage in August than in July, a situation which undeniably is bolstered by strong resistance to invasion of England, but which is being supported by substantial "peacetime" demand from makers of a variety of products, such as farm implements and household equipment. Railroad buying is more active, the 26,400-ton rail purchase this week by Illinois Central being the largest order for rails placed since Mid-June. Rail buying for the last two weeks, including 5000 tons by the Wabash and 20,000 tons for the Central of Brazil, totaled 54,600 tons.

• Mill operations reach new peak for 1940 at 91½ per cent . . . Steel prices reaffirmed for fourth quarter shipments . . . Bottleneck seen possible in structural shape output . . . Scrap composite up 8c. to \$19.08.

PURCHASE of 80,000 tons of steel by Ford Motor Co. was expected to be completed this week on a second period production budget for 150,000 automobiles, bringing Ford's total steel purchases for 1941 models to more than 210,000 tons.

Improvement in buying of structural shapes is a feature of the current steel market and some observers are already predicting that by mid-October a bottleneck may be found in structural shape production. Mills are operating at capacity and the tonnages involved in impending Government projects, many of which are for defense, are extremely large. Fabricated structural steel awards for the first eight months of 1940 are estimated by THE IRON AGE at 1,070,380 tons, compared with 1,111,375 tons in the corresponding period of 1939. Structural steel awards for the past week totaled 21,600 tons, compared with 22,000 tons in the preceding week and included 5000 tons for Bethlehem Steel Co.'s Lackawanna Plant, and 2660 tons for a trestle at the Cherokee Dam in Tennessee. New structural steel projects of 21,850 tons compare with 23,700 tons last week and include 8000 tons for a Douglas Aircraft Co. plant at Long Beach, Cal.

Included in reinforcing steel awards of 13,965 tons are 5000 tons for Naval aviation facilities and defense construction on islands in the Pacific and 2300 tons for the Kingsboro housing project in Brooklyn. The Navy Department has issued a schedule calling for 117,638 tons of steel for stock repairs and new ship construction for the six-month period of October, 1940, through March, 1941. Bids will be received up to Sept. 6.

Mixed trends in sentiment are noted in the scrap market, despite heavy steel company melting schedules. A 25c. increase in No. 1 heavy melting steel at Philadelphia has lifted THE IRON AGE scrap composite 8c. to \$19.08.

The Industrial Pace . . .

A MODERATE GAIN in the output of automobiles and a heavy rise in lettings of contracts for heavy construction projects associated with the national defense program were chiefly responsible for a rise of 2.4 points in THE IRON AGE index of capital goods for the week ended Aug. 24. This is the second consecutive rise from the low of the current movement, 84.1, recorded in the week of Aug. 10, and is the highest point reached since the week of July 6.

The weakness of the index over the past two months has been largely a reflection of lack of support from the automobile series due to the industry being engaged in its annual model changeover period. Now that production of 1941 models is under way at several plants and with others scheduled to get into production shortly, a period of upward movements in the combined index may be reasonably expected.

In addition to the new support obtained from the automobile series, the construction component, formerly the laggard of the index, is showing new life under the impetus of the national defense program. The dollar volume of heavy engineering construction projects awarded in the past week was \$128,449,000, the second highest weekly total of the current year and 184 per cent above the previous week. The week's increase was due almost entirely to publicly financed work, the total in this classification rising to \$109,435,000 in the past week from \$27,941,000 in the preceding period.

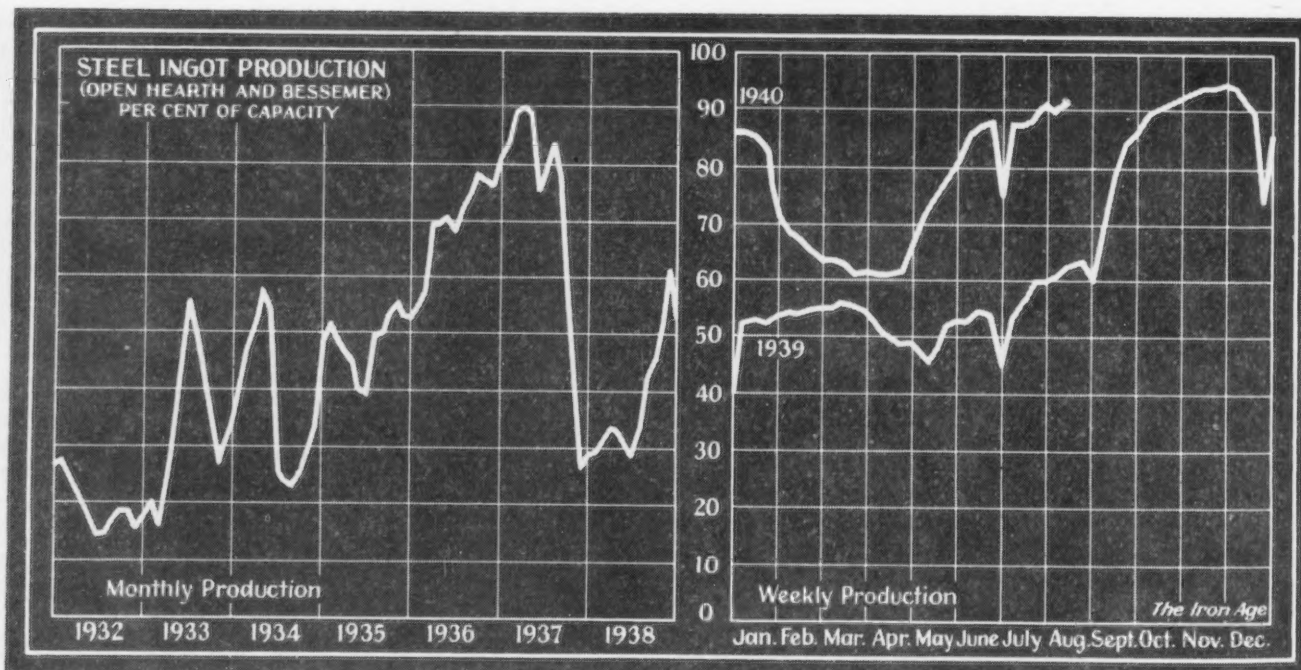
PRIVATELY FINANCED projects placed in the past week amounted to \$19,014,000, as compared with \$17,364,000 in the week previous. Barracks, improvement and enlargement of arsenals and airports, a new tank plant at Detroit and a smokeless powder plant at Radford, Va., accounted for the bulk of the increase in the public works total.

The contraseasonal decline in the Pittsburgh index was due largely to vacation shutdowns and the loss will likely be recovered in the current week.

AS A NATURAL sequence to the expansion in activity in the durable goods industries, as indicated by THE IRON AGE index, freight carloadings in August are showing small, but steady gains. Loadings in July (four weeks), were 2,825,752 cars, while, at the present rate, loadings (see graph) in August (five weeks) will total about 3,650,000. This would be the highest monthly total since the fall of 1937.

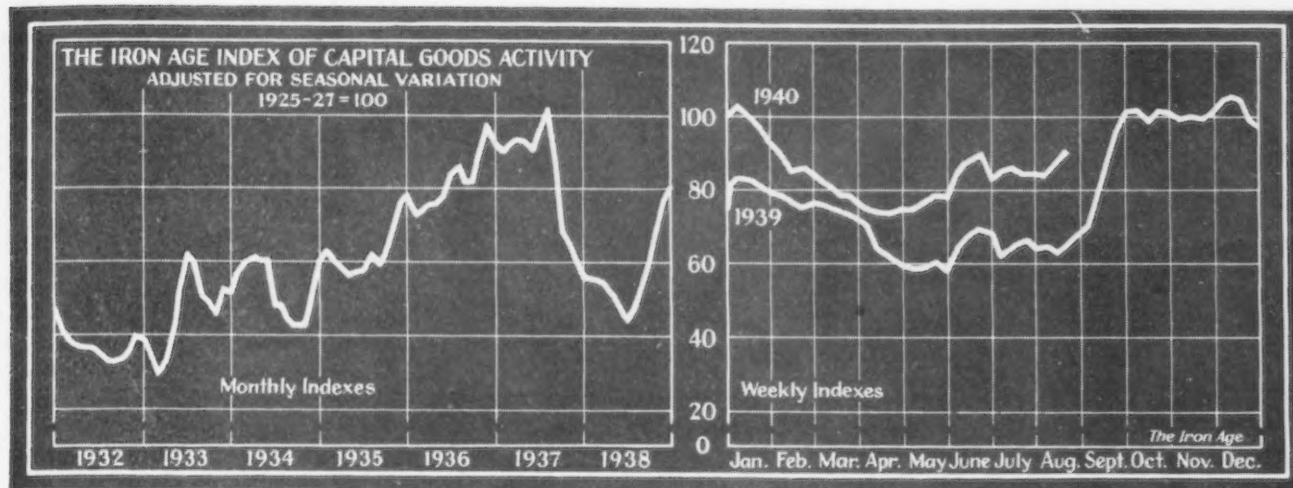
Despite the high rate of activity in the metal industry, prices of various metals and metal products have remained very steady thus far this year. Actually, prices in June and July were at slightly lower levels than earlier in the year. Some items which make up the widely diversified index of the Bureau of Labor (see accompanying graph) have risen lately, but these increases have been counteracted by declines in other items. The index represented by the graph covers manufactured metal products as well as the raw materials.

Ingot Rate Advances One Point to New High of 91½%



District Ingot Production, Per Cent of Capacity	Pittsburgh	Chicago	Valleys	Philadelphia	Cleveland	Buffalo	Wheeling	Detroit	Southern	S. Ohio River	Western	St. Louis	Eastern	Aggregate
Current Week	87.0	98.5	88.0	93.0	89.0	100.5	105.0	100.0	93.0	84.0	63.0	93.5	75.0	91.5
Previous Week	84.0	98.0	90.0	93.0	86.0	100.5	105.0	95.5	93.0	89.0	63.0	91.0	75.0	90.5

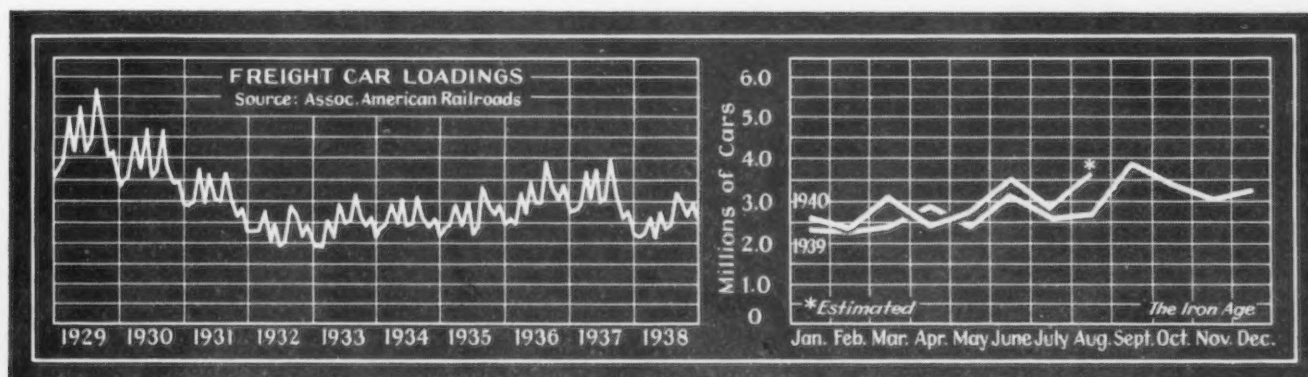
Capital Goods Index at Highest Point in 8 Weeks



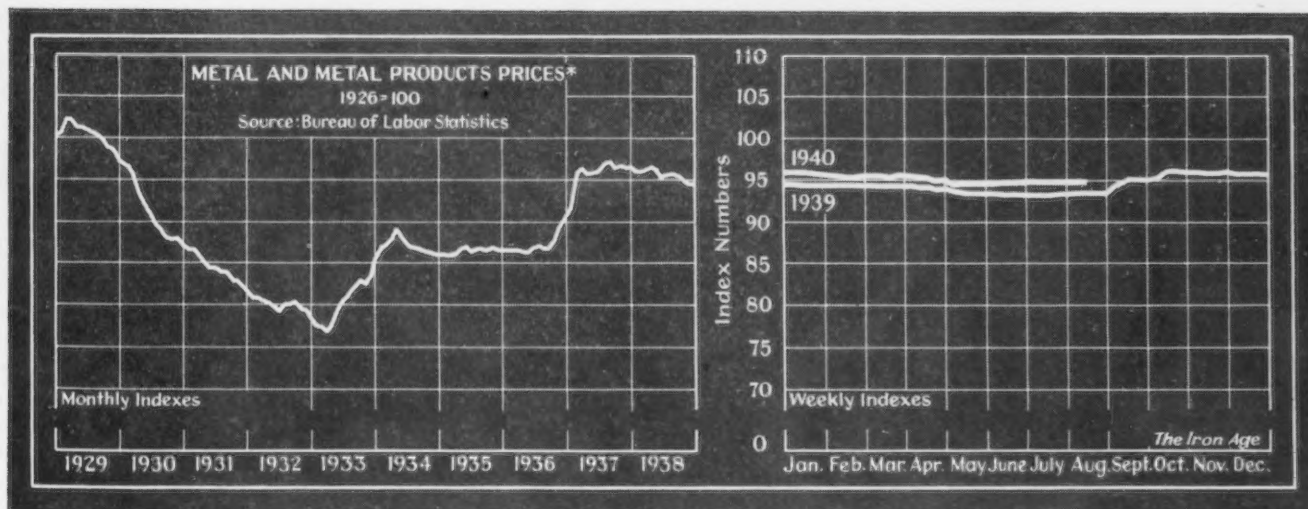
Component	Week Ended	Aug. 24	Aug. 17	July 27	Aug. 26 1939	Aug. 24 1929
Steel ingot production ¹		135.4	131.3	125.6	94.9	125.5
Automobile production ²		29.0	25.0	38.4	29.1	118.0
Construction contracts ³		99.3	91.0	83.6	68.7	111.5
Forest products carloadings ⁴		65.0	66.1	65.7	55.9	124.8
Pittsburgh output and shipments ⁵		108.6	112.0	108.4	79.9	126.2
COMBINED INDEX		87.5	85.1	84.3	65.7	121.2

Sources: ¹THE IRON AGE; ²Wards Automotive Reports; ³Engineering News-Record; ⁴Association of American Railroads; ⁵University of Pittsburgh. Indexes of forest products carloadings and activity in Pittsburgh area reflect conditions as of week ended Aug. 17. Other indexes cover week of Aug. 24.

Freight Carloadings Follow Moderate Upward Trend



Metal Prices Not Affected by High Output



* Based on 147 items, including iron, steel, non-ferrous metals and finished products such as agricultural equipment, automobiles, tools, bolts, etc.

Market News

...THE WEEK'S ACTIVITIES IN IRON AND STEEL

New Business

... Orders creep up at Cleveland, hold at Pittsburgh

In all probability August steel specifications at PITTSBURGH will run about 10 to 15 per cent behind July bookings when steel buying, especially export, was unusually heavy. Export demand in the past month, especially from the British, is more comparable with June bookings, whereas domestic steel purchases have picked up steadily in the past 10 days, a factor which is looked upon with considerable satisfaction by steel makers. PITTSBURGH steel producers are of the opinion that unless the British receive a serious setback both incoming steel business and production will be maintained at or above current levels for several weeks. Analysis of the recent pickup in domestic steel orders discloses more active demand for structural plates and shapes and hot rolled bars. Sheet and strip, tubular goods, and wire orders are holding at recent levels, while tin plate demand is off considerably.

As the month closes, aggregate steel orders have crept up at CLEVELAND and are now practically even with bookings of July upon the 26th of the month. Shipments are running about 15 per cent ahead. Order backlogs in stainless steel divisions have shown the greatest growth during the past month.

The recent improvement in sales at CLEVELAND and YOUNGSTOWN is credited entirely to the domestic market, since British and other export orders have remained on a fairly even keel. The automobile industry is taking heavier shipments. Construction projects are providing considerable stimulus to a wide range of steel products.

CLEVELAND steelmakers are more than ever inclined to the belief production will hover from 87 to 93 per cent indefinitely.

Incoming steel business at CHICAGO continues to support or to nearly support current operating rates at most district mills. The current rate of 98½ per cent of capacity is believed to be the highest ever attained by the mills in

this district. Five of the six district mills are operating at 100 per cent of capacity or more, and the sixth mill is at practical top capacity.

A great many orders have been placed here by the army and navy and other defense units. The surface, however, has scarcely been scratched, according to advice from Washington and elsewhere as to what is yet to come. Work is underway at district mills on shell steel both for England and for our own use. In one case it will be late fall before an English order is completed. Since bars are one of the items most in demand in the Chicago area, it is interesting to notice that some of the major bar consumers, such as forgers and cold drawers, are indirect recipients of many types of armament orders.

No pronounced change in either the volume or the nature of orders taken by larger producers in the PHILADELPHIA district is evident this week. Automobile buying has stimulated interest in flat rolled commodities, an appreciable tonnage having been placed this week by one large parts manufacturer, but heavier items remain the principal support of the market. Shapes are in especially strong demand.

Operations

... Mill schedules reach new 1940 high

Ingot production for the country this week is averaging 91½ per cent, a point above last week's level and a new high for 1940.

Gains of three points to 87 per cent at PITTSBURGH, a half point to 98½ per cent at CHICAGO, three points to 89 per cent at CLEVELAND, four and a half points at DETROIT, and approximately three points at ST. LOUIS accounted for the increase. The CHICAGO rate, an all-time high, is believed to be the maximum possible for that area.

Prices

... Quotations reaffirmed for fourth quarter delivery

Base prices on major steel products have been reaffirmed for fourth quarter delivery, an action

that has been expected for several weeks. On Aug. 27, Carnegie-Illinois Steel Corp. announced the following regarding fourth quarter prices: "The Carnegie-Illinois Steel Corp. announced today reaffirmation of its present base prices on hot rolled carbon steel semi-finished material, bars, structural shapes, plates, steel sheet piling, hot and cold rolled sheets, hot rolled strip and standard rails, as well as all hot rolled alloy steel items, excepting alloy plates, on which they have announced base prices of 3.275c. per 100 lb. delivered Pittsburgh, and 3.28c. per 100 lb. delivered Chicago, all for shipment to and including Dec. 31, 1940, for delivery and consumption in the United States.

"In this announcement it is stated the prices will apply only on such shipments as are made up to and including Dec. 31, 1940, and that any shipments after that will be billed at the prices then in effect."

Jones & Laughlin Steel Corp. has also reaffirmed present quotations on all hot rolled steel products for fourth quarter delivery, which would include hot rolled wire rods, skelp, and other hot rolled products not specifically mentioned in preceding announcements. American Steel & Wire Co. has reaffirmed present prices on cold rolled strip and commodity cold rolled strip for delivery in fourth quarter. Shipments made after that time will be billed at the prices in effect at time of shipment.

The new hot rolled alloy plate price is equivalent to 3.25c. a lb. f.o.b. Pittsburgh and Chicago.

With the reaffirmation of present prices for fourth quarter, whatever uncertainty may have existed in the minds of buyers as to the price levels for the final period of 1940, have been dispelled. Tin plate was not mentioned and it is assumed that a separate announcement will be forthcoming soon on this product.

The price of hot rolled alloy steel plates heretofore was arrived at by a buildup of alloy extras and conference with customers, but under existing circumstances, especially involving national defense work, it

has been found expedient to establish an actual base price for hot rolled alloy plates. It is expected soon that a complete new list of extras will be issued covering this product. It is also expected that some changes will be made soon in regular alloy extras covering hot rolled alloy semi-finished and finished products. There is a likelihood that adjustments will be made soon in the hot rolled carbon plate extra card. No specific reference to tin plate was made in Carnegie-Illinois' recent fourth quarter price announcement. Before the quarterly announcement, procedure was adopted for tin plate prices, the usual time for such data to be given to the trade was around the middle of or late in November. However, tin plate business will be accepted at current quotations for fourth quarter shipment, but shipments subsequent to that time will be governed by a price announcement which will undoubtedly come later this year.

It is not expected that merchant pig iron producers will officially reaffirm prices for fourth quarter delivery, but will accept fourth quarter business at present prices until further notice.

Railroad Buying

... Illinois Central Buys 26,400 tons of rails; 23 locomotives awarded

The largest rail purchase since the 46,000-ton buy of Chesapeake & Ohio and Nickel Plate in the middle of June was reported in the past week. This purchase, 26,400 tons by Illinois Central, together with 5000 tons bought last week by Wabash, brings total rail purchases of the past two weeks to 56,400 tons, including 20,000 tons bought by the Central of Brazil two weeks ago. The Illinois Central purchase was allocated as follows: 6600 tons to Carnegie-Illinois Steel Corp., 13,200 tons to Tennessee Coal, Iron & Railroad Co., and 6600 tons to Inland Steel Co. Wabash divided its tonnage as follows: 2750 tons to Carnegie-Illinois Steel Corp. and 1125 tons each to Inland Steel Co. and Bethlehem Steel Co.

The Chicago, Rock Island & Pacific Railroad has ordered 800 50-ton box cars from Pressed Steel Car Co. Union Pacific recently ordered 100 cement cars from General

American Transportation Corp. and the Erie Railroad will construct 325 70-ton gondola cars at its Dunmore shops, Scranton, Pa. Steel for these cars has been ordered recently. Pullman-Standard Car Mfg. Co. has booked orders for 100 hopper bottom coal cars from Monon, 100 hopper cars from Chicago, Indianapolis & Louisville, and 35 hopper cars from Charleston & Western Carolina.

Duluth, Missabe & Iron Range has awarded eightallet type locomotives to Baldwin Locomotive Works, and Elgin, Joliet & Eastern has purchased 15 diesel-electric switchers, dividing the purchase as follows: eight to Electro-Motive Corp., four to American Locomotive Co., and three to Baldwin Locomotive Works.

Chesapeake & Ohio is seeking bids on 10 2-6-6-2 typeallet locomotives and Pittsburgh & Lake Erie is inquiring for 1000 cars.

Pig Iron

... Shipments heavy at some points; sales hold

Shipments continue heavy at PITTSBURGH with backlogs sufficient to keep producers going for several months. Steel-making iron is still scarce and a step up in merchant iron demand would no doubt further complicate the raw material picture. Wheeling Steel Corp. has blown in a blast furnace at Martins Ferry, Ohio.

It is not expected that Pittsburgh merchant pig iron producers will officially reaffirm prices for fourth quarter delivery. Until further notice at least, companies will accept business for fourth quarter delivery at present prices. Any change which might come later in the year would of course depend upon circumstances. Prospect of unchanged prices in the coming quarter is not likely to have any effect upon current buying, except to possibly remove one incentive to forward buying. Only factor left in the market which might encourage making additional commitments at present is growing possibility of a shortage of supplies.

Scattered export orders have been received at CLEVELAND, most of them for small amounts to far-off nations. British and Canadian demand for steel making iron continues brisk. Merchant sales are on

the increase. Shipments in the CHICAGO district, both of pig iron and foundry coke, are slightly improved when compared with a month ago, and are expected to hold this gain for the month as a whole. In all probability industrial activity in this district in September will be such that demand will show a further improvement. At some mills here all available blast furnaces are in operation, whereas at others some iron making capacity is still idle. Blast furnace coke is not a problem just now but if present furnace operations continue unchanged for a considerable period or if additional stacks are blown in, some difficulty may be experienced by blast furnace operators in obtaining adequate coke supplies. The record high open hearth operations are calling for large tonnages of hot iron and in some cases in this district, mills are bolstering their own blast furnace capacity by transporting hot metal from available merchant furnaces. Since synthetic scrap is being manufactured in at least two mills here, it is doubtful if a pig iron shortage will develop soon. As long as hot metal can be spared and as long as scrap is available here, there seems little cause for worry over a shortage.

Specifications for pig iron against contract at CINCINNATI hold steadily to the peak level of June, with most melters consuming material received. New business is all but non-existent and inquiry is totally lacking. Foundries are operating at about 60 per cent of capacity with a slight improvement noted in automotive melt.

Market conditions at BUFFALO remain firm and strong. Possibility of a shortage of blast furnace coke might easily develop it is believed, because of the domestic demand and inability, because of the war, to obtain Canadian coke.

For the week of Aug. 25 pig iron production in the Birmingham district remains unchanged with all 18 blast furnaces in blast.

Releases in the PHILADELPHIA district have been a little stronger over the past week, much of this being due to the improved activity of jobbing foundries. Increased interest has been shown of late by buyers of malleable iron. New buy-

ing in the New York area is limited essentially to occasional round lots, usually for nearby delivery. Shipments continue very heavy and foundry operations continue to show a gradual improvement. Outside of an inquiry from South Africa involving between 10,000 and 12,000 tons of various grades of iron, there is little noteworthy business before the export trade. Several South American inquiries have been in the market lately, some rather substantial, but no actual business has yet developed.

Wire Products

... Buying better at Cleveland; exports spotty

Aggregate domestic demand at CLEVELAND is described as moderately better so far this month than in July. Export business, while spotty is very good in the aggregate. Production at CLEVELAND has been maintaining a steady course well below the ingot output average but above the level of one year ago. Total wire sales at PITTSBURGH have changed but little in the past week and if anything reflect a slightly less active market, although this condition might be reversed at any moment. Wire rod sales are holding at good levels and manufacturers' wire requirements are varied and moderate tonnage-wise. Merchant wire orders continue to be affected by seasonal influences.

Semi-Finished Steel

... Market still tight in leading centers

The semi-finished market at CLEVELAND and YOUNGSTOWN continues extremely tight. Sales of rods and billets for export have been brisk recently. Reports indicate skelp is none too plentiful, with one pipe producer attempting to pick up material in the open market to overcome a temporary difficulty.

As expected, current quotations have been reaffirmed for fourth quarter delivery. The influx of semi-finished steel orders at PITTSBURGH continues at a high level. Demand is exceptionally good for wire rods and skelp, and export demand, especially from Britain, remains an important factor on substantially all types of semi-finished steel. As suggested several

weeks ago, some steel companies not only have sold out semi-finished capacity for some weeks to come, but in one or two instances it has been necessary to seek additional supplies in the open market.

Plates

... Railroads enter market for larger tonnages

Wide plates at Chicago are still congested, a six to eight week wait being necessary for delivery, but narrow plates are available in a week to ten days. Some large tonnages have been ordered lately by railroads, presumably for repair programs and the car builders have also been in the market. There is reason to believe that considerable additional interest will be shown by both these sources in the near future. A Chicago base of 3.25c. a lb., has been announced for the first time on alloy steel plates. Some large carbon steel plates for shipbuilding purposes are being shipped from a district mill to England.

Plate sales at PITTSBURGH are as active as a week ago and total volume booked in the past week is equal to or greater than shipments. Active support is coming from ship and freight car builders, as well as tank and miscellaneous fabricators. Deliveries have become more extended, especially on wide plates and the appearance recently of a Naval inquiry for upwards of 100,000 tons of plates and sheets is significant in that total tonnages involved are somewhat higher than the normal inquiries from that source. This latter condition, of course, reflects increased activity because of national defense.

Orders in the CLEVELAND district were heavier than usual last week. Delivery promises of some mills are creeping back slowly. Reports indicate some steel companies are finding it impossible to meet schedules on plates for their own construction work.

Activity in the PHILADELPHIA market has shown signs of quieting somewhat now that immediate plate requirements for railroad carbuilding and repair programs have been satisfied. Current buying is largely of a miscellaneous nature.

New bookings in the NEW YORK area in the past week were very slow, but the volume of specifications received against previous

commitments, together with such new business as was taken, is still in most cases in excess of current rate of shipment. The present lull in buying has been accompanied by indications that some independent producers are accepting forward business more freely than in the past. Deliveries on narrow plates are available in some directions in two and three weeks, while the wider gages take from five to six weeks. Flanged heads and fabricated material runs from four to five weeks.

Outstanding inquiry is 117,638 tons of plates and shapes for the Navy. This bid covers requirements of various Navy yards over next quarter of this year and first quarter of next year. About 10,000 tons of plates will be required for 10 seaplane tenders, to be bid Sept. 25, and 2500 tons for eight minesweepers, to be bid Sept. 18.

Tin Plate

... Demand for this product continues least active

The tin plate market continues to represent the least active one as far as new business is concerned and orders booked this past week indicate no immediate change in the market situation. The export picture is still clouded by a lack of fresh demand as well as suspensions on orders placed previously. Domestic consumers, owing to these conditions, find it unnecessary to anticipate their requirements too far ahead, with the result that they are not in the same frame of mind as they were last fall when export demand was at its peak. Tin plate operations are estimated this week at 54 per cent, down four points from a week ago.

Tubular Goods

... August sales run behind July totals

Total tubular sales at PITTSBURGH for the month of August will run slightly behind July bookings but increased activity in the past two weeks has brought sales volume up to a moderately higher level than was indicated for the first two weeks of August. Practically all lines of tubular goods have followed this pattern with the exception of line pipe which was ordered out in large quantities during July. Oil-country goods specifications dis-

closed more life and standard pipe demand this month is about 10 per cent ahead of July bookings.

New tonnage at CLEVELAND so far this month has been running behind the July volume. Order backlogs are still of fair proportions, however, particularly in standard pipe, and several weeks more will be required before delivery promises return to normal, assuming that no bulge in buying appears in the intervening time. In addition to the brisk order situation in July, special circumstances surrounding installation of a new mill helped delay production by one maker. Reflecting numerous projects in smaller communities and oil developments, the market for cast pipe shows more life than heretofore, ST. LOUIS reports.

Sheets and Strip

... Demand continues heavy in most areas

Production at CLEVELAND and YOUNGSTOWN is gaining, assisted by larger releases from auto manufacturers and parts makers. Stocks in several district slab yards are depleted. Annealing capacity continues overtaxed. Inquiries involving defense requirements are heavy but most of the tonnage has yet to be placed. One current inquiry involves around 7000 tons of hot rolled strip and sheets for bomb racks. Delivery promises at CLEVELAND on hot rolled sheets are averaging about five weeks.

Releases at PITTSBURGH against previously placed commitments continue fairly heavy, the major portion of which recently has involved automotive business. Fresh orders at published prices, while numerically substantial, do not individually involve much tonnage. Mills claim that old bargain tonnage will be cleared from the mills by the end of this quarter with little or no exception but the accomplishment of these intents can be better judged at that time.

A fair demand for sheets exists in the CHICAGO district in spite of the heavy buying at the time of the \$4 a ton concession in price. Most of the buying today originating in this district is from a diversified group of consumers most of whom have already used the sheets they had ordered at lower prices. Releases from Detroit are

increasing week by week but it will probably be some time before the peak is reached with regard to buying for 1941 automobiles. As shipments proceed against the low-priced orders, it is becoming apparent that Sept. 30 will likely see this cheap tonnage removed from the books. Hot rolled sheets are available in one to three weeks and cold rolled in from three to four weeks. A four to five weeks' delay is necessary for shipment of wide strip, while narrow strip is available in two to three weeks.

CINCINNATI reports that with new models under way, automobile companies are more active in the current sheet market. Foreign demand there continues to be nil, although quotations are still being sought. Production is holding stubbornly to a level of about 75 per cent, although increases are expected to take care of backlogs built up for September shipment.

Merchant Bars

... August specifications overtaking July totals

Present prices have been extended for fourth quarter delivery. Although total hot rolled bar specifications booked so far this month at PITTSBURGH have run slightly behind the corresponding July period, the gap between the comparison is not as great as it was a few weeks ago. Within the past 10 days not only has automotive demand increased but there appears to have been a general realization on the part of domestic bar consumers that steel supplies might not be too plentiful within the next month or two. This has resulted in a slightly increased tempo of domestic buying.

At one CHICAGO sales office, hot rolled carbon bars are the most prominent item on the weekly sales list, and at a large Chicago mill, the bar mills are the most congested in the plant. Deliveries on bars are available in two to four weeks at some mills while at others a six to eight week delay is necessary, depending on the size required. The forgers, cold drawers, manufacturers of seamless tubing, and steel warehouses are all particularly active consumers of bars. Buying lately by manufacturers of farm implements and industrial and farm tractors, has not been

quite as heavy as was the case a month or so ago.

The situation at CLEVELAND shows very little change from the last report, except that deferred inquiries have become even more numerous and buyers seeking quick shipment on small tonnages even more insistent. The large proposal for 10,000 tons per month for anti-aircraft shells is still in circulation.

Structural Steel

... Awards 21,600 tons; new projects 21,850 tons

Fabricated structural steel awards total 21,600 tons, including 5000 tons for the Bethlehem Steel Co. Lackawanna plant. Other sizable lettings are 2660 tons for a trestle at the Cherokee Dam, Tenn., 1675 tons for an S. E. A. depot building in Alabama, 1500 tons at St. Paul, Minn., for a power house addition for the Northern States Power Co., and 1100 tons at Cleveland for the Diesel Engine Division of the General Motors Corp. New structural steel projects of 21,850 tons compare with 23,700 tons last week.

Reinforcing Bars

... Awards for week total 13,965 tons

Reinforcing steel awards call for 13,965 tons and include 5000 tons for naval aviation facilities and defense construction on islands in the Pacific Ocean; 2300 tons in Brooklyn for the Kingsboro housing project; 1800 tons at Wolf Creek, Okla., for the Fort Supply Dam, and 1000 tons for the South End housing project in Bridgeport, Conn. No new reinforcing inquiries of more than 500 tons were reported.

Bolts, Nuts and Rivets

... Shipments top July; automotive orders off

Shipments of CLEVELAND bolt and nut producers are running above the July level. Automotive orders are off compared to the previous month, but new business is expected in early September together with generous buying from other sources. With export business increasing and government defense requirements barely started, all forecasts for the fall are optimistic.

Machine Tools

... SALES, INQUIRIES AND MARKET NEWS

Sales Stay at High Level

New York

••• There was no apparent let-up in the volume of machine tool sales made in this area in the past week. While some of the recent large inquiries for production machinery on the part of firms who expect to sign contracts for defense work shortly have not yet materialized into orders, new business from the aircraft engine builders has begun to come out in volume. Wright Aeronautical Corp. has just begun to release orders for its \$8,000,000 tooling program for the new plant to be erected near Cincinnati, and Pratt & Whitney is now issuing order numbers for machines in batches of 20 to 25.

In recent weeks the British Purchasing Commission has greatly enlarged previous commitments for rifle cartridge making presses. The machinery is to be retained in this country and the work apparently is to be done on a contract fee basis by some of the New England cartridge makers.

Domestic Orders Remain High

Cleveland

••• Domestic orders continue to pour in upon the principal producers here. Led by requirements of defense industries, bookings show no sign of slackening, and from the extent of inquiries the peak of buying is still some months in the future. From Aug. 1 to Aug. 25 one machine tool manufacturer here booked just about double the company's production for the entire month. Diversified defense projects rather than a few large awards were responsible for the order volume.

The aircraft industry continues most prominent. One aircraft parts manufacturer here purchased a number of lathes during the past week. Plans of the Curtiss-Wright Corp. for a huge airplane plant in Southern Ohio appear progressing swiftly. Several million dollars of machine tools will be required and Cleveland machine building tool companies will share in the orders.

An interesting sideline is that one large machine producer here

has spent over a million dollars for new machine tools in the past year.

Orders Well Diversified

Chicago

••• New orders for machine tools at Chicago are being received in undiminished volume and one local sales office has already this month received more than twice the business booked in all of July. Small tool sales are also showing an increase. With the exception of a few large orders placed a week or so ago, most of the machine tool business received so far this month consists of individual orders from a well diversified group of consumers. Many different industries are represented and many of the purchases have no connection whatsoever with the defense program. On the other hand, there are a considerable number of machine tools being ordered every week by companies with Government orders. The Hannifin Mfg. Co. and the Miehle Printing Press & Mfg. Co. are only two of a sizeable group of manufacturers in the latter class, the former having received a large order for recoil mechanisms, and the latter, for naval gun mounts. Studebaker, it has been learned unofficially, has received an order for about 7000 shell lathes, which are being manufactured in its South Bend, Ind., plant.

Defense Plans Bring Orders

Cincinnati

••• Receipt of some defense orders from industry was reported in this area during the past week, in addition to strictly government business. Chrysler corporation has rounded out its program for tank production with some of the needed tools being ordered here, although exact types and quantities are undisclosed. Figuring on the Packard requirements for airplane motors continues, although no actual orders have yet been reported. Orders from British sources, particularly Canada, continue to flow into the market, but other foreign demand is not great. Domestic business is steady and unchanged. Manufacturers continue to work

over plans for increasing production and factory space, but as yet these plans are in unsettled state.

Plants are operating at virtual capacity.

Preference Classifications For Defense Contracts

••• The Preference Classifications Committee of the Army and Navy Munitions Board has begun to assign informal priorities on defense contracts placed with private industry. Class A preferential ratings are being given to Army and Navy orders that require preferred treatment, and these ratings are subdivided as to urgency, which is largely related to the agreed upon date of completion of the contract.

In the past week, one industrial concern in calling for bids on machine tools needed for carrying out such a contract, has called attention to its assigned classification as a priority ruling. The National Defense Advisory Committee points out, however, that the set-up is built around informal co-operation on the part of industry, and no attempt is being made to enforce compulsion. As such, priorities on machine tool deliveries do not exist, although since early in the year preferential treatment has been given certain key industries, such as the aircraft engine manufacturers.

Pittsburgh Mills List Equipment Capacities

Pittsburgh

••• A program has been launched here whereby existing manufacturers in this industrial area can obtain government defense work rather than have the government establish additional production facilities before the production capacity of this state or Allegheny county as a whole is reached.

The Pittsburgh Commission for Industrial Expansion and the Industrial Development Division of the Emergency Committee of the Pittsburgh district joined forces last week in a survey of existing manufacturing facilities capable of aiding in the national defense program.

Non-Ferrous Metals

... MARKET ACTIVITIES AND PRICE TRENDS

New York, Aug. 27—Non-ferrous markets for the most part maintained a firm undertone in the past week, the only loss being recorded in tin, which eased $\frac{1}{8}$ c. at midweek to 50.625c. This loss was counterbalanced by a gain in lead, quoted today at 4.75c., St. Louis. The copper market, though not overly active, continues strong at 11.00c., bolstered by a fair volume of domestic sales. Many buyers seem to be temporarily satisfied as to immediate requirements and are engaged at present in using up stocks of material bought recently. Considering the high rate of consumption, it seems safe to assume that additional metal in large volume will be needed within a reasonable time.

July consumption of copper was slightly less than in the June period, a fact not entirely expected, considering mill operations. At present heavy deliveries are being maintained, with brass mills apparently taking a preponderance of the shipments.

Zinc

Zinc prices remained unchanged this past week in a market from which large volume sales were absent. Sellers seem reluctant to accept all offered business at prevailing levels, preferring to limit sales to the rate at which material is being taken in at the smelters. In some cases reserves have had to be cut into in order to meet the requirements of regular customers. Shipments are being requested on schedule by consumers, the chief difficulty of sellers at present being the maintenance of adequate reserve stocks.

Lead

The market received its second price move within two weeks unexpectedly, when American Smelting & Refining Co. raised its price to 4.90c. New York, on Wednesday. July statistics showing decreased stocks were thought to have less to do with the increase than the strong demand felt recently by custom smelters. July figures reveal shipments at better than 50,000 tons, largest since last November, and a substantial increase over June figures. After an appreciable volume of forward business was placed last week, the market opened this week rather quietly.

Tin

A Further reduction in tin prices to 50.625c. per lb., New York, developed this week, but with little or no effect on buyers, the market continuing very much in the doldrums. Some spot Straits metal has been sold in small volume but, by and large, little interest is being shown. In spite of the recent arrival of heavy shipments, sellers do not seem very anxious to get rid of material at present levels. Approximately 12,000 tons of metal has been taken into the country so far this month, a figure considerably in excess of actual consumption for the period.

(Non-ferrous prices on page 91)

"They're Good Hoists—we wouldn't be without them"

—Say Works Managers



• Works Managers of many plants recommend Northern Hi-Lift Hoists in warmest terms. They know that they will do the work day after day at low cost and least trouble.

Northern Hi-Lift Hoists are built to take it. Liberal design—welded rolled steel construction—machine cut hardened steel gears—give them plenty of strength and endurance. Hyatt roller bearings provide efficiency and long life. Extreme high lift saves space—increases usefulness. Accessibility provides easy maintenance.

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NORTHERN ENGINEERING WORKS
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CRANES *Northern* HOISTS

Scrap

... MARKET ACTIVITIES AND QUOTATION TRENDS

• • • Not a great deal of activity took place in consumer district scrap markets during the past week and mixed trends in sentiment are noted, although in no instance has the price trend been downward. Despite peak operations at Chicago, the market has developed an uncertain tone, but prices are unchanged in the absence of any real test. No change is recorded in Pittsburgh quotations and transactions are at a low level there. Moderate activity is reported at Youngstown, however, and a 50c. advance in prices is drawing scrap material out of the Pittsburgh area. Only real strength is discerned at Philadelphia, where domestic mill buying has warranted an advance of 25c. in the average price of No. 1 steel to a flat \$20, a full \$1 above the Pittsburgh level. The composite price has risen 8c. to \$19.08.

Dealer buying prices are somewhat stronger at St. Louis, Cincinnati and Boston, and are unchanged at New York and Detroit, but the market at the latter point is easier and isolated offers point to signs of a possible recession.

Pittsburgh

The undertone continues exceptionally strong although there have been few actual transactions in the past week. No. 1 heavy melting continues quotable at \$18.50 to \$19, with very little material being picked up within those ranges. Pittsburgh brokers and dealers are finding more lucrative outlets for some of their supplies in the Youngstown district where higher prices are being paid.

Chicago

Further mill sales at \$18.50 a gross ton have stabilized this market at that level for the time being. Brokers are paying from \$18.50 to \$18.75 and in a few cases \$19 has been paid. With Chicago district operations at an all-time high, it would seem that this market could show signs of nothing but bullishness. There is nevertheless some uncertainty in the trade as to the price trend over the next few weeks, though most of the sentiment is on the upward side.

Philadelphia

Steel scrap quotations show additional strength here for the fourth consecutive week, with No. 1 heavy melting steel quoted at a flat \$20 and No. 2 steel at a flat \$19. Most of the support comes

from coverage of old orders by brokers. Cast and blast furnace scrap are also stronger, several grades being marked up 50c. Material is available only in small tonnages at present prices while doubt is expressed as to whether even higher prices will produce a heavy inflow. Export quotations are purely nominal as broker's buying activity has completely ceased.

Youngstown

No. 1 heavy melting steel is quoted up 50c. this week to a range of \$19 to \$19.50. There has been some moderate activity to support this change. Electric furnace grades are none too plentiful.

Cleveland

Although all indications point to a stronger market here, not enough specific activity has come to light to support changes in published prices. No. 1 heavy melting remains at \$18 to \$18.50. Automotive lists this week, followed by railroad lists, are expected to establish the position of the market more clearly.

Buffalo

There has been no resumption of mill buying here. One large consumer is reported holding up shipments. Prices remain firm and unchanged although export demand from Canada has slowed up considerably. Low phos. demand is steady with the supply none too plentiful. Increased production of home scrap is credited for the present \$18 to \$18.50 quotation on No. 1 heavy melting, worth \$22 a ton a few months ago.

St. Louis

Prices are somewhat irregular, but general trend is upward. Offerings continue light from all sources, particularly from country dealers who are holding for higher prices. Sales of No. 2 heavy melting steel were made last week at \$15. Mills buying would have taken round tonnages had it been available. Outside inquiry has increased, especially for blast furnace material.

Birmingham

Tone of the market here is much stronger, particularly in the export field where prices on recent sales have been \$1 to \$2 higher than July prices. Indications point to August being one of the largest months of the year from the standpoint of tonnage shipped from Gulf ports.

Cincinnati

Prices are stronger here and mills are taking scrap at a good rate, but insisting on proper grading. Bidding is more active as dealers seek to increase supplies against broader consumer interest, and quotations this week are up an average of 50c.

Detroit

The local market is easier and there is some indication of a definite recession in the price level, with brokers in some instances lowering their offering prices to yard dealers 50c. per ton last Saturday. The about-face in sentiment is attributable to lack of response on the part of consumers and a refusal to support current prices which in a measure were brought about by outside buying in this area. Actual reduction in quotations on a general scale is held up pending indications that will be given when automotive lists close on the final days of this week. The general assumption is that prices will not move higher, at least.

New York

While market sentiment is still on the bullish side, there has been no change in buying prices over the past week. Shipments from small dealers to the larger yards have been rather slow, but heavier volume is looked for after Labor day. Loading for export continues apace, with no difficulty experienced in obtaining required export licenses. Board of Transportation is taking bids on demolition of a section of the Sixth Avenue elevated railway, involving about 63,000 tons of heavy scrap. Bid form stipulates that material cannot be shipped for export.

Boston

Any differential brokers paid for steel turnings for eastern Pennsylvania and Weirton delivery apparently has evaporated, current price being \$8.50 a ton on cars for both destinations. Demand for breakable cast has quickened and prices are 75c. a ton higher. Prices on shafting and blast furnace material are about 25c. a ton higher and very firm. At Providence a boat is loading No. 2 steel for Japan, the first loading since export restrictions were put into effect. From Boston, shipments to England are going forward at the rate of one or two boats per week.

Toronto

Business in various markets here has settled down to a state of intense activity with dealers and consumers extending every effort to obtain supplies. Demand of the primary steel producers has attained the highest rate in history, and as a result steel companies are taking all offerings. Electric furnace users also are heavy buyers of steel scrap. Foundries, implement makers, radiator and sanitary ware manufacturers have been more prominent in the market recently for cast scrap and stove plate and there is a tendency on the part of some to pay above market for desirable lots, but no advances in buying prices have been indicated by dealers. Montreal dealers still are shipping to Ontario melters, and one local melter is moving cast scrap from Winnipeg to its plant.

IRON AND STEEL SCRAP PRICES

PITTSBURGH

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.50 to \$19.00
Railroad heavy mltng.	20.50 to 21.00
No. 2 heavy melting	17.00 to 17.50
Railroad scrap rails	21.50 to 22.00
Rails 3 ft. and under	22.50 to 23.00
Comp. sheet steel	18.50 to 19.00
Hand bundled sheets	17.50 to 18.00
Heavy steel axle turn.	18.00 to 18.50
Machine shop turnings	14.00 to 14.50
Short shov. turnings	16.00 to 16.50
Mixed bor. & turn.	12.50 to 13.50
Cast iron borings	12.50 to 13.50
Cast iron carwheels	20.50 to 21.00
Heavy breakable cast	17.00 to 17.50
No. 1 cupola cast	19.50 to 20.00
RR. knuckles & coup.	25.00 to 25.50
Rail coil springs	25.00 to 25.50
Rail leaf springs	25.00 to 25.50
Rolled steel wheels	25.00 to 25.50
Low phos. billet crops	24.50 to 25.50
Low phos. punchings	25.00 to 26.00
Low phos. heavy plate	24.00 to 24.50
Railroad malleable	23.50 to 24.00

PHILADELPHIA

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$20.00
No. 2 hvy. mltng. steel	19.00
Hydraulic, bund., new	20.00
Hydraulic bund., old	\$17.00 to 17.50
Steel rails for rolling	22.50 to 23.00
Cast iron carwheels	21.50 to 22.00
Hvy. breakable cast	20.50 to 21.00
No. 1 cupola cast	22.00 to 22.50
Mixed yard (fd'y) cast	18.50 to 19.00
Stove plate (steel wks.)	17.00 to 17.50
Railroad malleable	22.50 to 23.00
Machine shop turn.	14.00 to 14.50
No. 1 blast furnace	13.00 to 13.50
Cast borings	13.00 to 13.50
Heavy axle turnings	18.00 to 18.50
No. 1 low phos. hvy.	24.00 to 24.50
Couplers & knuckles	24.00 to 24.50
Rolled steel wheels	24.00 to 24.50
Steel axles	23.50 to 24.00
Shafting	24.50 to 25.00
Spec. iron & steel pipe	17.00 to 17.50
Cast borings (chem.)	14.00 to 14.50

CHICAGO

Delivered to Chicago district consumers:

Per Gross Ton

Hvy. mltng. steel	\$18.50
Auto. hvy. mltng. steel	
alloy free	\$17.25 to 17.50
No. 2 auto steel	14.75 to 15.25
Shoveling steel	18.50
Factory bundles	17.75 to 18.00
Dealers' bundles	16.25 to 16.50
No. 1 busheling	17.25 to 17.50
No. 2 busheling, old	10.00 to 10.50
Rolled carwheels	21.50 to 22.00
Railroad tires, cut	21.00 to 21.50
Railroad leaf springs	19.50 to 20.00
Steel coup. & knuckles	21.50 to 22.00
Axle turnings	16.75 to 17.25
Coil springs	22.00 to 22.50
Axle turn. (elec.)	17.50 to 17.75
Low phos. punchings	20.50 to 21.00
Low phos. plates 12 in. and under	20.50 to 21.00
Cast iron borings	12.00 to 12.50
Short shov. turn.	12.75 to 13.25
Machine shop turn.	12.00 to 12.50
Rerolling rails	21.50 to 22.00
Steel rails under 3 ft.	21.50 to 22.00
Steel rails under 2 ft.	22.00 to 22.50
Angle bars steel	21.00 to 21.50
Cast iron carwheels	18.50 to 19.00
Railroad malleable	22.50 to 23.00
Agric. malleable	14.75 to 15.25

Per Net Ton

Iron car axles	23.50 to 24.00
Steel car axles	22.00 to 22.50
Locomotive tires	15.00 to 15.50
Pipes and flues	11.50 to 12.00
No. 1 machinery cast	17.00 to 17.50
Clean auto. blocks	17.25 to 17.75
No. 1 railroad cast	15.50 to 16.00
No. 1 agric. cast	13.50 to 14.00
Stove plate	10.75 to 11.25
Grate bars	12.50 to 13.00
Brake shoes	12.50 to 13.00

YOUNGSTOWN

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$19.00 to \$19.50
No. 2 hvy. mltng. steel	18.00 to 18.50
Low phos. plate	22.00 to 22.50
No. 1 busheling	18.25 to 18.75
Hydraulic bundles	18.50 to 19.00
Machine shop turn.	13.00 to 13.50

CLEVELAND

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.00 to \$18.50
No. 2 hvy. mltng. steel	17.00 to 17.50

Comb. sheet steel	\$17.50 to \$18.00
Light bund. stampings	14.50 to 15.00
Drop forge flashings	17.00 to 17.50
Machine shop turn.	11.50 to 12.00
Short shov. turn.	12.00 to 12.50
No. 1 busheling	17.25 to 17.75
Steel axle turnings	17.00 to 17.50
Low phos. billet and bloom crops	23.00 to 23.50
Cast iron borings	12.00 to 12.50
Mixed bor. & turn.	12.00 to 12.50
No. 2 busheling	12.00 to 12.50
No. 1 cupola cast	21.00 to 21.50
Railroad grate bars	14.00 to 14.50
Stove plate	14.00 to 14.50
Rails under 3 ft.	24.00 to 24.50
Rails for rolling	23.00 to 23.50
Railroad malleable	22.00 to 22.50

BUFFALO

Per gross ton delivered to consumer:

No. 1 hvy. mltng. steel	\$18.00 to \$18.50
No. 2 hvy. mltng. steel	16.00 to 16.50
Scrap rails	20.00 to 20.50
New hvy. b'ndled sheets	16.00 to 16.50
Old hydraul. bundles	14.50 to 15.00
Drop forge flashings	16.00 to 16.50
No. 1 busheling	16.00 to 16.50
Machine shop turn.	11.00 to 11.50
Shov. turnings	13.00 to 13.50
Mixed bor. & turn.	11.50 to 12.00
Cast iron borings	11.50 to 12.00
Knuckles & couplers	22.00 to 22.50
Coil & leaf springs	22.00 to 22.50
Rolled steel wheels	22.00 to 22.50
No. 1 machinery cast	19.50 to 20.00
No. 1 cupola cast	18.00 to 18.50
Stove plate	15.50 to 16.00
Steel rails under 3 ft.	23.50 to 24.00
Cast iron carwheels	18.00 to 19.00
Railroad malleable	22.00 to 23.00

ST. LOUIS

Dealers' buying prices per gross ton delivered to consumer:

Selected hvy. melting	\$16.00 to \$16.50
No. 1 hvy. melting	15.75 to 16.25
No. 2 hvy. melting	14.50 to 15.00
No. 1 locomotive tires	17.00 to 17.50
Misc. stand. sec. rails	18.00 to 18.50
Railroad springs	20.00 to 20.50
Bundled sheets	11.50 to 12.00
Cast bor. & turn.	9.00 to 9.50
Machine shop turn.	8.50 to 9.00
Heavy turnings	12.00 to 12.50
Rails for rolling	20.00 to 20.50
Steel car axles	21.00 to 21.50
No. 1 RR. wrought	12.00 to 12.50
No. 2 RR. wrought	15.00 to 15.50
Steel rails under 3 ft.	20.75 to 21.25
Steel angle bars	18.00 to 18.50
Cast iron carwheels	18.25 to 18.75
No. 1 machinery cast	19.00 to 19.50
Railroad malleable	19.00 to 19.50
Breakable cast	16.00 to 16.50
Stove plate	12.00 to 12.50
Grate bars	13.00 to 13.50
Brake shoes	14.50 to 15.00

CINCINNATI

Dealers' buying prices per gross ton at yards:

No. 1 hvy. mltng. steel	\$15.25 to \$15.75
No. 2 hvy. mltng. steel	13.75 to 14.25
Scrap rails for mltng.	20.75 to 21.25
Loose sheet clippings	10.75 to 11.25
Hyd'lic bundled sheets	14.50 to 15.00
Cast iron borings	6.75 to 7.25
Machine shop turn.	7.75 to 8.25
No. 1 busheling	11.25 to 11.75
No. 2 busheling	5.50 to 6.00
Rails for rolling	22.25 to 22.75
No. 1 locomotive tires	17.50 to 18.00
Short rails	22.75 to 23.25
Cast iron carwheels	16.75 to 17.25
No. 1 machinery cast	19.25 to 19.75
No. 1 railroad cast	17.75 to 18.25
Burnt cast	11.25 to 11.75
Stove plate	11.25 to 11.75
Agricul. malleable	15.75 to 16.25
Railroad malleable	18.75 to 19.25
Mixed hvy. cast	16.50 to 17.00

BIRMINGHAM

Per gross ton delivered to consumer:

No. 1 hvy. melting steel	\$15.00
No. 2 hvy. melting steel	14.00
No. 1 busheling	13.00
Scrap steel rails	15.00
Steel rails under 3 ft.	17.50
Rails for rolling	17.50
Long turnings	5.00
Cast iron borings	8.50
Stove plate	11.00
Steel axles	13.00
No. 1 RR. wrought	12.00
No. 1 cast	16.00
No. 2 cast	12.50
Cast iron carwheels	13.00
Steel carwheels	15.00

DETROIT

Dealers' buying prices per gross ton, f.o.b. cars:

No. 1 heavy melting	\$15.00 to \$15.50
No. 2 heavy melting	14.00 to 14.50
Borings and turnings	10.75 to 11.25
Long turnings	9.75 to 10.25
Short shov. turnings	10.75 to 11.25
No. 1 cast	18.50 to 19.00
Automotive cast	18.50 to 19.00
Hvy. breakable cast	15.00 to 15.50
Stove plate	11.75 to 12.25
Hydraul. Comp. sheets	17.00 to 17.50
New busheling	16.00 to 16.50
Sheet clips	14.00 to 14.50
Flashings	15.00 to 15.50
Low phos. plate	18.50 to 19.00

NEW YORK

Dealers' buying prices per gross ton on cars:

No. 1 hvy. mltng. steel	\$15.50 to \$16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
Hvy. breakable cast	16.00 to 16.50
No. 1 machinery cast	17.50 to 18.00
No. 2 cast	15.00 to 15.50
Stove plate	12.50 to 13.00
Steel car axles	20.00 to 20.50
Shafting	20.00 to 20.50
No. 1 RR. wrought	14.50 to 15.50
No. 1 wrought long	13.00 to 13.50
Spec. iron & steel pipe	12.00 to 12.50
Rails for rolling	16.50 to 17.50
Clean steel turnings*	9.00 to 9.50
Cast borings*	8.50 to 9.00
No. 1 blast furnace	8.50 to 9.00
Cast borings (chem.)	10.00 to 11.00
Unprepared yard scrap	8.00 to 8.50
Light iron	6.00 to 6.50

Per gross ton delivered local foundries:
No. 1 machin. cast...\$18.00 to \$19.00
No. 2 cast...16.00 to 16.50

* \$1.50 less for truck loads.

BOSTON

Dealers' buying prices per gross ton:

Breakable cast	\$14.75 to \$15.00
Machine shop turn.	8.50
Mixed bor. & turn.	6.75 to 7.00
Bun. skeleton long	11.50 to 12.00
Shafting	19.00 to 19.25
Stove plate	11.25 to 11.50
Cast bor. chemical	8.00 to 8.50

Per gross ton delivered consumers' yards:

Textile cast	\$17.00 to \$20.00
No. 1 machine cast	17.00 to 19.00

Per gross ton delivered dealers' yards:

No. 1 hvy. mltng. steel	\$13.75 to \$14.00
No. 2 steel	12.75 to 13.00

PACIFIC COAST

Per net ton delivered to consumer:

	San Fran.	Los Ang.	Seattle
No. 1 hvy. mltng. steel	\$13.00	\$13.00	\$13.00
No. 2 hvy. mltng. steel	12.00	12.00	12.00
Bundles	11.00	11.00	11.00

CANADA

Dealers' buying prices at these yards, per gross ton:

	Toronto	Montreal
Low phos. steel	\$11.50	\$11.00
No. 1 hvy. mltng. steel	11.25	10.75
No. 2 hvy. mltng. steel	10.00	9.50
Mixed dealers steel	8.75	8.25
Drop forge flashings	9.75	9.25
New loose clippings	8.75	8.25
Busheling	6.00	5.50
Scrap pipe	7.75	7.25
Steel turnings	7.25	6.75
Cast borings	6.75	6.25
Machinery cast	20.00	19.00
Dealers' cast	19.00	18.00
Stove plate	14.50	13.50

EXPORT

Dealers' buying prices per gross ton:

New York, truck lots, delivered, barges	
No. 1 hvy. mltng. steel	\$15.50 to \$16.00
No. 2 hvy. mltng. steel	14.00 to 14.50
No. 2 cast	15.00 to 15.50
Stove plate	12.50 to 13.00

Boston on cars at Army Base or Mystic Wharf

No. 1 hvy. mltng. steel	\$16.00 to \$16.25
No. 2 hvy. mltng. steel	14.50 to 14.75
Rail (scrap)	16.00 to 16.50

Philadelphia, delivered alongside boats, Port Richmond

No. 1 hvy. mltng. steel	\$17.75 to \$18.00
No. 2 hvy. mltng. steel	16.50 to 17.00

Construction Steel

...STRUCTURAL STEEL, REINFORCING BARS, PLATES, PILING, ETC.

Fabricated Steel

Lettings of 21,600 tons almost equal those of a week ago; new projects of 21,850 tons compare with 23,700 tons last week; plate awards total 1245 tons.

AWARDS

NORTH ATLANTIC STATES

- 5000 Tons, Lackawanna, N. Y., plant and coke ovens for Bethlehem Steel Company; Wilputte Coke Oven Corp., Pittsburgh, general contractor; steel to be fabricated at Bethlehem's Lackawanna plant.
- 700 Tons, Brooklyn, contract No. 2, construction shaft for New York City Tunnel Authority, to American Bridge Co., Pittsburgh.
- 405 Tons, Reading, Pa., factory addition, Parish Pressed Steel Co., to Belmont Iron Works, Philadelphia.
- 340 Tons, Monessen, Pa., Pittsburgh Steel Co., cleaning house, to Pittsburgh Bridge & Iron Works Co., Pittsburgh.
- 290 Tons, Dornsife, Pa., State highway bridge, to Fort Pitt Bridge Works Co., Pittsburgh.
- 215 Tons, Blair County, Pa., bridge, route 47, to American Bridge Co., Pittsburgh.
- 175 Tons, Great Works, Me., bleach room alterations, for Penobscot Chemical & Fibre Co., to Bethlehem Fabricators, Inc., Bethlehem, Pa.
- 175 Tons, Bristol, Pa., boiler house, Rohm & Hass, to Belmont Iron Works, Philadelphia.
- 145 Tons, Chicopee Falls, Mass., central heating plant for U. S. Army, to Haarman Steel Co., Holyoke, Mass.
- 141 Tons, Brooklyn, Kingsboro houses, to unnamed bidder.
- 140 Tons, Boston Navy Yard, extension to steel storage building, to Phoenix Bridge Co., Phoenixville, Pa.
- 125 Tons, Elizabeth, N. J., building for P. J. Schweitzer, Inc., to Oltmer Iron Works, Jersey City.

THE SOUTH

- 2660 Tons, Cherokee Dam, Tenn., TVA-214544 trestle, to Mount Vernon Bridge Co., Mount Vernon, Ohio.
- 1675 Tons, State of Alabama, depot building, S. E. A. Airport, to Virginia Bridge Co., Roanoke, Va.
- 977 Tons, Beaumont, Tex., Kansas City Southern Railroad bridge, to Kansas City Structural Steel Co., Kansas City, Kan.
- 710 Tons, Windsor Station, W. Va., West Pennsylvania Power Station, to Fort Pitt Bridge Works Co., Pittsburgh.

- 655 Tons, Bowie and Cass Counties, Tex., bridge FAP-314, to Mosher Steel Co., Dallas, Tex.
- 540 Tons, State of Alabama, repair shop, S. E. A. Airport, to Nashville Bridge Co., Nashville, Tenn.
- 510 Tons, Charleston, W. Va., United Carbon Co., office building, to Pittsburgh Bridge & Iron Works Co., Pittsburgh.
- 390 Tons, Dallas, Tex., transmission towers, Dallas Power & Light Co., to Emeco Derrick & Equipment Co., Los Angeles.
- 275 Tons, Memphis, hangar, to Wisconsin Bridge & Iron Co., Milwaukee.
- 260 Tons, St. Petersburg, Fla., power house, Utility Management Corp., to Belmont Iron Works, Philadelphia.
- 225 Tons, Ries, Tenn., State Procurement office, beams, to Nashville Bridge Co., Nashville, Tenn.
- 125 Tons, Lafayette, Miss., bridge, to Virginia Bridge Co., Roanoke, Va.
- 110 Tons, Shelby County, Tenn., bridge FAP-300, to Pidgeon-Thomas Iron Co., Memphis.

CENTRAL STATES

- 1500 Tons, St. Paul, power house addition, Northern States Power Co., to St. Paul Foundry Co. Portions sublet to St. Paul Structural Steel Co. and Minneapolis-Moline Power Implement Co., Minneapolis.
- 1000 Tons, Cleveland, plant additions for Diesel Engine Division, General Motors Corp., to Austin Co., Cleveland.
- 730 Tons, LeGrange, Ill., addition for Electro-Motive Corp., to Joseph T. Ryerson & Son, Inc., Chicago.
- 300 Tons, Gary, Ind., Republic Steel mill buildings, to Truscon Steel Co., Youngstown.
- 220 Tons, Detroit, forge building, Budd Wheel Co., to R. C. Mahon Co., Detroit.
- 135 Tons, Viroqua, Wis., State bridge No. 755, to an unnamed bidder.
- 125 Tons, Chicago, vertical lift trucking bridge for Milwaukee Road, to Wisconsin Bridge & Iron Co., North Milwaukee.
- 110 Tons, Tyron, Mich., bridge B1 of 36-6-1, to Worden-Allen Co., Milwaukee.
- 105 Tons, Stager, Mich., State highway bridge, to Worden-Allen Co., Milwaukee.

WESTERN STATES

- 400 Tons, San Diego, Cal., Marine Corps base, to Pacific Iron & Steel Co., Los Angeles, through O. W. Karn and Los Angeles Contracting Co., Los Angeles, contractors.

PENDING STRUCTURAL PROJECTS

NORTH ATLANTIC STATES

- 3000 Tons, Quonset Point, R. I. land plane hangars for Navy Department.
- 900 Tons, New York, Boston Road bridge.

- 673 Tons, Pittsford, N. Y., highway bridge, project F.A.R.C. 40-77.
- 490 Tons, New York, building for St. Vincent's Hospital.
- 385 Tons, Quonset Point, R. I., paint and oil storehouse for Navy Department.
- 350 Tons, Philadelphia, Federal Reserve Bank addition, Erwin & Leighton Co., Philadelphia, general contractor.
- 195 Tons, Philadelphia, addition to St. Luke's hospital.
- 160 Tons, Beaver County, Pa., State overpass.
- 150 Tons, Allegany County, N. Y., two highway bridges; Steinbiser Co., Belfast, N. Y., low bidder on general contract.
- 135 Tons, Chemung County, N. Y., jail building.
- 110 Tons, Elmira, N. Y., building for Colonial Theater.
- 110 Tons, Pittsburgh, addition to Letsche School.
- 100 Tons, Buffalo, office building and plant addition for Metal & Alloy Specialties Co.
- 100 Tons, Ilion, N. Y., plant No. 2 for Remington Rand Co., Inc.

THE SOUTH

- 2800 Tons, Portsmouth, Va., tremie trusses for Navy Department.

CENTRAL STATES

- 610 Tons, Cowden, Ill., Nickle Plate Railroad, 900-ft. viaduct; bids Sept. 10.
- 565 Tons, Toledo, Ohio, power plant extension for Toledo Edison Co.
- 375 Tons, State of Indiana, bridges.
- 350 Tons, Wyndmere, N. D., State overhead crossing, FAGH-286-A.
- 320 Tons, Youngstown, Ohio, repairs to Mahoning bridge; Emanuel Katzman, contractor.
- 257 Tons, Belvidere, Ill., warehouse for Keene Belvidere Can Co.; bids in.
- 200 Tons, Chicago, trusses for building for unnamed owner.
- 175 Tons, Franklin, Ind., State bridge No. 2014.
- 175 Tons, Cleveland, factory building for Eaton Mfg. Co.
- 150 Tons, Indianapolis, hangar, Roscoe Turner Aeronautical Corp.; bids in.
- 150 Tons, Mechanicsburg, Ind., State bridge No. 2011.
- 115 Tons, Crookston, Neb., State viaduct.
- 115 Tons, Faribault, Minn., coaling stations for Milwaukee Road.
- 110 Tons, Lansing, Mich., building for Howard Sober.

WESTERN STATES

- 8000 Tons, Long Beach, Cal., Douglas Aircraft Co. plant.
- 250 Tons, Kettle Falls, Wash., overhead crossing for Bureau of Reclamation; bids Sept. 7.

Weekly Bookings of Construction Steel

Week Ended—→	Aug. 27, 1940	Aug. 20, 1940	July 30, 1940	Aug. 29, 1939	Year to Date	
					1940	1939
Fabricated structural steel awards	21,600	22,000	49,100	13,000	618,025	642,025
Fabricated plate awards	1,245	10,250	1,210	950	109,800	110,635
Steel sheet piling awards	0	280	1,630	1,200	30,940	45,705
Reinforcing bar awards	13,965	10,440	15,400	8,900	311,615	313,010
Total Letting of Construction Steel	36,810	42,970	67,340	24,050	1,070,380	1,111,375

150 Tons, Stevens and Lincoln Counties, Wash., State bridges, bearing piles; Angeles Gravel & Supply Co., Port Angeles, Wash., low bidder on general contract.

105 Tons, Sublette County, Wyo., bridges and culverts on Big Piney-Kemmerer Road; bids Aug. 29.

FABRICATED PLATES

AWARDS

480 Tons, Long Beach, Cal., 30-in. pipe, to Western Pipe & Steel Co., San Francisco.

430 Tons, Sitka and Kodiak Island, Alaska, two 50,000 bbl. tanks, to Chicago Bridge & Iron Co., Chicago, through Siems-Drake-Puget Sound, Seattle, contractor.

196 Tons, Newark, N. J., tank, to Chicago Bridge & Iron Co.

140 Tons, Memphis, Tenn., discharge pipes, to an unnamed company.

PENDING PROJECTS

300 Tons, Long Beach, Cal., Metropolitan Water District pipe line (Specifications 342); bids Sept. 4.

SHEET PILING

PENDING PROJECTS

132 Tons, Parker, Ariz., Indian Service (Invitation 103); bids Aug. 30.

Cast Iron Pipe

Miami, Fla., plans new main 42-in. line in Miami Beach district, extending from bay to water station at Hialeah, for supply feeder. Surveys have been authorized. Cost close to \$675,000. William Sydow is director of public service.

Stillwater, Okla., plans pipe line from Lake Carl Blackwell for main water supply. Surveys are under way. Cost estimated about \$200,000. George H. Rendleman is superintendent of water and light department.

Albia (Monroe County), Iowa, plans pipe lines for water system and other waterworks installation. Cost estimated about \$30,000.

La Valle, Wis., plans pipe lines for water system and other waterworks installation. Cost estimated about \$86,000, of which \$32,000 will be a bond issue and remainder secured through Federal aid. Special election has been called Sept. 17 to approve bonds in amount noted. Frank J. Davy & Son, 502 Main Street, La Crosse, Wis., are consulting engineers.

Perry, Ohio, plans pipe lines for water system and other waterworks installation. Cost estimated at \$63,000. Financing is being arranged through Federal aid. C. J. Simon, Evans Central Building, Van Wert, Ohio, is consulting engineer.

Shreveport, La., plans about 15,000 lin. ft. for extensions in water system. James S. Reilly is commissioner of public utilities.

Knoxville, Iowa, has authorized pipe line for main supply from river source to connection with system in downtown district. Cost about \$130,000. Foth & Boyds, Green Bay, Wis., are consulting engineers.

Glenwood Springs, Colo., plans 16-in. for main water supply from point near Noname Creek to municipality. Financing will be arranged through Federal aid.

Nacogdoches, Tex., plans pipe lines for extensions and replacements in water system. Cost over \$50,000.

Burbank, Cal., bids on 143 tons of 6-in. pipe show National Cast Iron Pipe Co., Los Angeles, low bidder.

San Francisco takes bids September 6 on 287 tons of 8-in. pipe (Invitation 2493).

Oakland, Cal., East Bay Municipal Utility District bids show United States Pipe & Foundry Co., San Francisco, low bidder on 154 tons on 10 and 16-in. pipe.

Reinforcing Steel

Awards of 13,965 tons; 2,260 tons in new projects

AWARDS

ATLANTIC STATES

2300 Tons, New York, Kingsboro housing project, to Seaboard Steel Products Corp., New York.

1000 Tons, Bridgeport, Conn., South End housing project, to Truscon Steel Co., Youngstown, through E. & F. Construction Co.

400 Tons, Annapolis, Md., naval buildings, to Bethlehem Steel Co., Bethlehem, Pa., through McCloskey Co., Philadelphia.

180 Tons, Chicopee, Mass., central heating plant, New England Air Base, to Bethlehem Steel Co., Bethlehem, Pa., through Bass Engineering & Construction Co., contractor.

130 Tons, Groton, Conn., subbase building and quay wall, to Bethlehem Steel Co., Bethlehem, Pa., through F. H. McGraw & Co., contractor.

SOUTH AND CENTRAL

1800 Tons, Wolf Creek, Okla., Fort Supply dam, U. S. Engineers, to Colorado Fuel & Iron Co., Denver, through Leo Sander Co., contractor.

700 Tons, Toledo, Ohio, expansion for Libbey-Owens-Ford Glass Co., to Pollak Steel Co., Cincinnati, through A. Bentley & Sons.

427 Tons, Pontiac, Mich., Yellow Truck & Coach Co. expansion, to Truscon Steel Co., Youngstown, through Darien & Armstrong.

270 Tons, Ottumwa, Iowa, Morrell & Co. building, to Laclede Steel Co., St. Louis, through Stark Building Co., contractor.

250 Tons, Peoria, Ill., substructure State highway bridge to Inland Steel Co., Chicago, through Great Lakes Dredge & Dock Co., Chicago.

150 Tons, Vandalia, Ohio, Aero Products Division building, General Motors Corp., to Bethlehem Steel Co., Bethlehem, Pa., through F. Messer & Son, contractor.

150 Tons, Minneapolis, Rahr Malting Co. elevator, to Laclede Steel Co., St. Louis.

150 Tons, Eustis, Fla., high school, to Truscon Steel Co., Youngstown, through Florida Steel Products Co.

140 Tons, Milwaukee, factory building, Allen-Bradley Co., to Joseph T. Ryerson & Son, Inc., Chicago.

120 Tons, Columbus, Ind., school and church, to Truscon Steel Co., Youngstown.

108 Tons, Yukon, Fla., air base, to Truscon Steel Co., Youngstown, through Duval Engineering & Construction Co.

103 Tons, Chicago, warehouse, Illinois Meat Co., Joseph T. Ryerson & Son, Inc., Chicago.

100 Tons, Detroit, school, Lady Queen of Heaven, to Great Lakes Steel Corp., Ecorse, Mich., through Taylor-Gaskin.

WESTERN STATES

5000 Tons, Pacific Ocean Islands, Naval aviation facilities and defense construction, to Bethlehem Steel Co., San Francisco, through Raymond Concrete Pile Co., Turner Construction Co., Hawaiian Dredging Co., J. H. Pomeroy Co., and Morrison-Knudsen Co., Alameda, Cal., joint contractors.

278 Tons, Camarillo, Cal., Camarillo State Hospital buildings, to Consolidated Steel Corp., Los Angeles, through Azevedo Construction Co., Sacramento, Cal., contractor.

109 Tons, South Pasadena, Cal., construction of Arroyo Seco Parkway between Pasadena Avenue at Avenue 35 and Avenue 26, to Blue Diamond Corp., Los Angeles; through Nick Perscallo, Los Angeles, contractor.

100 Tons, Los Angeles, expansion at Seal Beach for Dow Chemical Co., to Truscon Steel Co., Youngstown, through Austin Co.

PENDING REINFORCING BAR PROJECTS

ATLANTIC STATES

400 Tons, Washington, Sears-Roebuck & Co. store; bids in.

111 Tons, Pittsford, N. Y., highway project F.A.R.C. 40-77.

SOUTH & CENTRAL

500 Tons, Jeffersonville, Ind., Quartermaster Depot warehouses; bids in.

360 Tons, Gary, Ind., Ivanhoe and Duneland housing projects; Superior Construction Co., low bidder.

250 Tons, Fredericksburg, Va., highway bridge; bids Aug. 29.

WESTERN STATES

177 Tons, Point Arena, Cal., Schooner Gulch bridge; bids Sept. 11.

HAWAII

460 Tons, Honolulu, T. H. Sears-Roebuck & Co. store; bids in on general contract.

Pipe Lines

Phillips Petroleum Co., Bartlesville, Okla., plans welded steel pipe line from oil refinery at Borger, Tex., to San Antonio, Tex., and point on Gulf Coast, where bulk terminal will be located, for gasoline transmission. Cost over \$350,000.

Baldwin, La., has let contract to Boh Brothers Construction Co., 2400 Cypress Street, New Orleans, for pressure pipe line system for natural gas distribution, including main welded steel pipe line for connection with supply source. F. P. Joseph, Glenmora, La., is consulting engineer.

General Purchasing Officer, Panama Canal, Washington, asks bids until Sept. 9 for 277,000 lin. ft. of galvanized carbon steel pipe. Also for 34,200 lin. ft. of cement-lined cast iron pipe, cast iron pipe fittings, cast steel flanges, etc. (Schedule 4294).

Jefferson County Gas Co., Brookville, Pa., plans steel pipe lines in conjunction with development of natural gas properties in Snyder Township, Jefferson County, including well-drilling, gathering lines and main pipe line for connection with present system.

Union Pipe Line Co., Centralia, Ill., Thomas H. McCullough, president, plans steel pipe line gathering system in recently developed oil field area near Falls City, Richardson County, Neb., with main pipe line for connection with present feeder line to Minneapolis, Minn.

Reserve Gas Pipe Line Co., Dallas, Tex., care of J. Wallace Bostick, 3116 Main Street, Dallas, is projecting plans for new 12-in. welded steel pipe line from point near Texas-Louisiana state line to New York State, about 1500 miles, for natural gas transmission. Proposed line will pass through Louisiana, Mississippi, Alabama, Georgia, South and North Carolina, Virginia, Maryland and thence to a point in Pennsylvania, with facilities for natural gas distribution at Philadelphia and vicinity; from that district, line will pass through New Jersey into New York. Cost estimated about \$80,000,000, of which approximately \$5,000,000 will be used for compressor stations along route and other operating facilities. Company has made application to Federal Power Commission for permission to construct line and will arrange financing through Gloré, Forgan & Co., 38 Wall Street, New York, bankers, it is stated, with the sale of company securities.

Arcadia, Cal., closes bids Sept. 3 for 5200 lin. ft. of 16-in. welded steel pipe for water system. G. B. Watson is city engineer.

City Clerk, City Hall, Arcadia, Cal., takes bids Sept. 3 for furnishing 5200 ft. of 16-in. steel pipe with coal tar exterior coating.

Estacada, Ore., has awarded steel pipe, valves and air valves for water supply system to Consolidated Supply Co., Portland, Ore., at \$38,562.

Bishop, Cal., takes bids August 29 for construction of water system involving 13,000 ft. of 12-in. pipe, 1500 ft. of 10-in. pipe, and 2100 ft. of 8-in. pipe and fittings. George L. Wood, Bishop, is water superintendent.

Prices of Finished Iron and Steel...

Steel prices on these pages are f.o.b. basing points (in cents per lb.) unless otherwise indicated. On some products either quantity deductions or quantity extras apply. In many cases gage, width, cutting, physical, chemical extras, etc., apply to the base price. Actual realized prices to the mill, therefore, are affected by extras, deductions, and in most cases freight absorbed to meet competition.

Basing Point ↓ Product													DELIVERED TO		
	Pitts- burgh	Chicago	Gary	Cleve- land	Birm- ingham	Buffalo	Youngs- town	Spar- rows Point	Granite City	Middle- town, Ohio	Gulf Ports, Cars	Pacific Ports, Cars	Detroit	New York	Phila- delphia
SHEETS															
Hot rolled	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢	2.20¢	2.10¢		2.65¢	2.20¢	2.34¢	2.27¢
Cold rolled ¹	3.05¢	3.05¢	3.05¢	3.05¢		3.05¢	3.05¢		3.15¢	3.05¢		3.70¢	3.15¢	3.39¢	3.37¢
Galvanized (24 ga.)	3.50¢	3.50¢	3.50¢		3.50¢	3.50¢	3.50¢	3.50¢	3.60¢	3.50¢		4.05¢		3.74¢	3.67¢
Enameling (20 ga.)	3.35¢	3.35¢	3.35¢	3.35¢			3.35¢		3.45¢	3.35¢		4.00¢	3.45¢	3.71¢	
Long ternes ²	3.80¢		3.80¢									4.55¢			
Wrought iron	4.75¢														
STRIP															
Hot rolled ³	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢			2.10¢		2.75¢	2.20¢		
Cold rolled ⁴	2.80¢	2.90¢		2.80¢			2.80¢	(Wor- cester =	3.00¢)				2.90¢		
Cooperage stock	2.20¢	2.20¢			2.20¢		2.20¢								
Commodity C-R	2.95¢			2.95¢			2.95¢	(Wor- cester =	3.35¢)				3.05¢		
TIN PLATE															
Standard cokes (Per 100-lb. base box)	\$5.00	\$5.00	\$5.00						\$5.10						
BLACK PLATE															
29 gage ⁵	3.05¢	3.05¢	3.05¢						3.15¢			4.05¢ (10)			
TERNES, M'FG															
Special coated (Per base box)	\$4.30		\$4.30						\$4.40						
BARS															
Carbon steel	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢		(Duluth = 2.25¢)			2.50¢	2.80¢	2.25¢	2.49¢	2.47¢
Rail steel ⁶	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢					2.40¢	2.70¢			
Reinforcing (billet) ⁷	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢	2.15¢			2.50¢	2.55¢	2.25¢		
Reinforcing (rail) ⁷	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢	2.05¢				2.40¢	2.45¢	2.15¢		
Cold finished ⁸	2.65¢	2.65¢	2.65¢	2.65¢		2.65¢							2.70¢		
PLATES															
Carbon steel	2.10¢	2.10¢	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢	(Costesville and Claymont = 2.10¢)		2.45¢	2.65¢		2.29¢	2.15¢
Wrought iron	3.80¢														
Floor plates	3.35¢	3.35¢									3.70¢	4.00¢		3.71¢	
SHAPES															
Structural	2.10¢	2.10¢	2.10¢		2.10¢	2.10¢		(Bethlehem = 2.10¢)			2.45¢	2.75¢		2.27¢	2.215¢
SPRING STEEL C-R															
0.26 to 0.50 Carbon	2.80¢			2.80¢				(Wor- cester = 3.00¢)							
0.51 to 0.75 Carbon	4.30¢			4.30¢				(Wor- cester = 4.50¢)							
0.76 to 1.00 Carbon	6.15¢			6.15¢				(Wor- cester = 6.35¢)							
1.01 to 1.25 Carbon	8.35¢			8.35¢				(Wor- cester = 8.55¢)							
WIRE⁹															
Bright	2.60¢	2.60¢		2.60¢	2.60¢			(Wor- cester = 2.70¢)							
Galvanized	2.60¢	2.60¢		2.60¢	2.60¢			(Wor- cester = 2.70¢)							
Spring	3.20¢	3.20¢		3.20¢	3.20¢			(Wor- cester = 3.30¢)							
PILING															
Steel sheet	2.40¢	2.40¢				2.40¢					2.85¢	2.95¢			
IRON BARS															
Common		2.25¢			(Terra Haute, Ind. = 2.15¢)										
Refined	3.75¢														
Wrought	4.40¢														

¹ Mill run sheets are 10c. per 100 lb. less than base; and primes only, 25c. above base. ² Unassorted 8-lb. coating. ³ Widths up to 12 in. ⁴ Carbon 0.25 per cent and less. ⁵ Applies to 29 gage within certain width and length limitations. ⁶ For merchant trade. ⁷ Straight lengths as quoted by distributors. ⁸ Also shafting. For quantities of 20,000 to 39,999 lb. ⁹ Carload lots to manufacturing trade. ¹⁰ Boxed.

PRICES

SEMI-FINISHED STEEL

Billets, Blooms and Slabs

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Buffalo, Birmingham, Sparrows Point (Re-rolling only). Prices delivered Detroit are \$2 higher f.o.b. Duluth, billets only, \$2 higher.

Per Gross Ton

Re-rolling \$34.00
Forging quality 40.00

Shell Steel

Basic open hearth shell steel f.o.b. Pittsburgh and Chicago.

Per Gross Ton

3 in. to 8 in. \$54.00
8 in. to 12 in. 52.00
12 in. to 18 in. 54.00
18 in. and over. 56.00

Note: The above base prices apply on lots of 1000 tons of a size and section to which are to be added extras for chemical requirements, cutting to length, or quantity. This type of steel is for hot rolled sections used for the making of shells and includes rounds, round squares, and special sections.

Sheet Bars

Pittsburgh, Chicago, Cleveland, Youngstown, Buffalo, Canton, Sparrows Point, Md.

Per Gross Ton

Open hearth or bessemer \$34.00

Skelp

Pittsburgh, Chicago, Youngstown, Coatesville, Pa., Sparrows Point, Md.

Per Lb.

Grooved, universal and sheared. 1.90c.

Wire Rods

(No. 5 to 9/32 in.)

Per Lb.

Pittsburgh, Chicago, Cleveland 2.00c.
Worcester, Mass. 2.10c.
Birmingham 2.00c.
San Francisco 2.50c.
Galveston 2.25c.

9/32 in. to 47/64 in., \$3 a net ton higher. Quantity extras apply.

ROOFING TERNE PLATE

(F.o.b. Pittsburgh; Package, 112 Sheets)

	20x14 in.	20x28 in.
8-lb. coating I.C.	\$6.00	\$12.00
15-lb. coating I.C.	7.00	14.00
20-lb. coating I.C.	7.50	15.00
25-lb. coating I.C.	8.00	16.00
30-lb. coating I.C.	8.63	17.25
40-lb. coating I.C.	9.75	19.50

WIRE PRODUCTS

(To the Trade, f.o.b. Pittsburgh, Chicago, Cleveland, Birmingham)

Base per Keg

Standard wire nails \$2.55
Coated nails 2.55
Cut nails, carloads 3.85

Base per 100 Lb.

Annealed fence wire \$3.05

Base Column

Woven wire fence* 67
Fence posts (carloads) 69
Single loop bale ties 56
Galvanized barbed wire† 70
Twisted barbless wire 70

*15½ gage and heavier. †On 80-rod spools in carload quantities.
Note: Birmingham base same on above items, except spring wire.

BOLTS, NUTS, RIVETS, SET SCREWS

Bolts and Nuts

(F.o.b. Pittsburgh, Cleveland, Birmingham or Chicago)

Per Cent Off List

Machine and carriage bolts:
½ in. and 6 in. and smaller. 68½
Larger and longer up to 1 in. 66
1½ in. and larger 64
Lag bolts 66

Plow bolts, Nos. 1, 2, 3, and 7. 68½
Hot pressed nuts; c.p.c., t-nuts; square, hex., blank or tapped:
½ in. and smaller 67
9/16 in. to 1 in. inclusive 64
1½ in. to 1½ in. inclusive 62
1½ in. and larger 60

On above items, excepting plow bolts, additional allowance of 10 per cent for full container quantities.

On all of the above items there is an additional 5 per cent allowance for car-load shipments.

Semi-fin. hexagon nuts U.S.S. S.A.E.

½ in. and smaller.	67	70
9/16 to 1 in.	64	65
1½ in. through 1½ in.	62	62
1½ in. and larger.	60	60

In full container lots, 10 per cent additional discount.

Stove bolts, packages, nuts loose

75 and 10

Stove bolts in packages, with nuts attached 75
Stove bolts in bulk 83½

On stove bolts freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago, New York, lots of 200 lb. or over.

Large Rivets

(½ in. and larger)

Base per 100 Lb.

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham \$3.40

Small Rivets

(7/16 in. and smaller)

Per Cent Off List

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham 65 and 10

Cap and Set Screws

Per Cent Off List

Milled hexagon head, cap screws, 1 in. dia. and smaller. 50 and 10
Milled headless set screws, cut thread ¼ in. and larger. 64
3/16 in. and smaller. 73
Upset hex. head cap screws U.S.S. or S.A.E. thread 1 in. and smaller 70
Upset set screws, cup and oval points 75
Milled studs 52

Freight allowed up to 65c. per 100 lb. based on Cleveland, Chicago or New York on lots of 200 lb. or over.

NON-FERROUS PRICES

Cents per lb. for early delivery

	Aug. 21	Aug. 22	Aug. 23	Aug. 24	Aug. 26	Aug. 27
Copper, Electrolytic ¹	11.00	11.00	11.00	11.00	11.00	11.00
Copper Lake	11.00	11.00	11.00	11.00	11.00	11.00
Tin, Straits, New York.	50.75	50.625	50.625	....	50.625	50.625
Zinc, East St. Louis ²	6.50	6.50	6.50	6.50	6.50	6.50
Lead, St. Louis ³	4.60	4.75	4.75	4.75	4.75	4.75

¹ Mine producers' quotations only, delivered Conn. Valley. Deduct ¼c. for approximate New York delivery price. ² Add 0.39c. for New York delivery. ³ Add 0.15c. for New York delivery.

Warehouse Products

Cents per lb., Delivered

	New York	Cleveland
Tin		
Straits pig	51.75	53.50
Copper		
Electro	12.25	12.125
Castings	12.50	11.875
H. R. sheets*	19.62	19.62
Seamless tubes*	20.12	20.12
Brass		
Yellow, sheets*	18.23	18.23
Yellow, rods*	13.26	13.26
Seamless tubes*	20.98	20.98
Zinc		
Slabs	7.60	7.75
Sheets, No. 9 casks..	12.50	14.00
Lead		
American pig	6.00	5.40
Bar	7.95	8.00
Cut sheets	8.15	8.15
Antimony		
Asiatic	16.00	17.00
Aluminum		
Virgin, 99%	20.00	21.00
No. 1 remelt., 98-99%	18.00	18.50
Solder		
½ and ½	31.25	31.75
Babbitt		
Anti-friction grade ..	23.50	21.25

Old Metals

Cents per lb., New York

Buying prices are paid by dealers for miscellaneous lots from smaller accumulators. Selling prices are those charged to consumers after the metal has been prepared for their use.

	Dealers' Buying Prices	Dealers' Selling Prices
Copper		
Hvy. crucible	8.750	9.375
Hvy. and wire.	7.750	8.125
Light and bottoms.	6.750	7.25
Brass		
Heavy	4.875	5.380
Light	3.875	4.625
No. 1 yel. turn.	4.50	5.50
No. 1 red or compo. turnings	7.125	7.625
Hvy. Mach. compo.	7.375	8.00
Lead		
Heavy	2.875	4.250
Aluminum		
Cast	8.00	9.00
Sheet	13.00	14.00
Zinc	3.75	4.50

Miscellaneous Non-Ferrous Prices

ALUMINUM, delivered: virgin, 99 per cent plus, 18c.-19c. a lb.; No. 12 remelt No. 2 standard, 18c.-19c. a lb. NICKEL, electrolytic, 35c.-36c. a lb. base refinery, lots of 2 tons or more. ANTIMONY, prompt: Asiatic, 16.50c. a lb., New York; American, 13c. a lb., f.o.b. smelter. QUICK-SILVER, \$183-\$185 per flask of 76 lb. BRASS INGOTS, commercial 85-5-5-5, 11.75c. a lb.

*These prices, which are also for delivery from Chicago warehouses, are quoted with the following percentages allowed off for extras: on copper sheets, 33½; on brass sheets and rods, 40; on brass tubes, 33½, and copper tubes, 40.

PRICES

ALLOY STEEL

Alloy Steel Blooms, Billets and Slabs

Base per gross ton, f.o.b. Pittsburgh, Chicago, Canton, Massillon, Buffalo or Bethlehem.....\$54.00

Alloy Steel Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Buffalo, Bethlehem, Massillon or Canton.

Open-hearth grade 2.70c.
Delivered, Detroit 2.80c.

S.A.E. Series Numbers	Alloy Differential, per 100 Lb.
2000 (1.5 Ni)	\$0.35

2100 (1.5 Ni)	0.75
2300 (3.5 Ni)	1.55
2500 (5 Ni)	2.25
3100 Ni-Cr	0.70
3200 Ni-Cr	1.35
3300 Ni-Cr	3.80
3400 Ni-Cr	3.20
4100 Cr-Mo (0.15 to 0.25 Mo.)..	0.55
4100 Cr-Mo (0.25 to 0.40 Mo.)..	0.75
x4340 Cr-Ni-Mo	1.65
4340 Cr-Ni-Mo	1.85
4600 Ni-Mo (0.2-0.3 Mo, 1.5-2 Ni)	1.10
5100 (0.60-0.90 Cr)	0.35
5100 (0.80-1.10 Cr)	0.45
5100 Cr spring steel	0.15
52-100 Cr. (electric furnace)....	2.60
6100 Cr-V bar	1.20

6100 Cr-V spring steel	0.85
Cr-Ni-V	1.50
C-V	0.85

The above differentials are for hot rolled finished products. The differential for most grades in electric furnace steel is 50c. higher. Slabs with a section area of 16 in. and 2½ in. thick or over take the billet base.

Alloy Cold-Finished Bars

Base per pound, f.o.b. Pittsburgh, Chicago, Gary, Cleveland or Buffalo, 3.35c. Delivered Detroit, 3.45c., carlots.

STAINLESS AND HEAT-RESISTANT ALLOYS

(Base prices, cents per lb., f.o.b. Pittsburgh)

Chromium-Nickel

No.	304	302
Forging billets	21.25c.	20.40c.
Bars	25.00c.	24.00c.
Plates	29.00c.	27.00c.
Structural shapes	25.00c.	24.00c.
Sheets	36.00c.	34.00c.
Hot rolled strip	23.50c.	21.50c.
Cold rolled strip	30.00c.	28.00c.
Drawn wire	25.00c.	24.00c.

Straight-Chromium

No.	410	430	442	446
Bars ..	18.50c.	19.00c.	22.50c.	27.50c.
Plates ..	21.50c.	22.00c.	25.50c.	30.50c.
Sheets ..	26.50c.	29.00c.	32.50c.	36.50c.
H'tstrip ..	17.00c.	17.50c.	24.00c.	35.00c.
C'd st. ..	22.00c.	22.50c.	32.00c.	52.00c.

TOOL STEEL

(F.o.b. Pittsburgh)

Base per Lb.

High speed	67c.
High-carbon-chromium	43c.
Oil-hardening	24c.
Special	22c.
Extra	18c.
Regular	14c.

Prices for warehouse distribution to all points on or East of Mississippi River are 2c. a lb. higher. West of Mississippi quotations are 3c. a lb. higher.

ELECTRICAL SHEETS

(F.o.b. Pittsburgh)

Base per Lb.

Field grade	3.20c.
Armature	3.55c.
Electrical	4.05c.
Motor	4.95c.
Dynamo	5.65c.
Transformer 72	6.15c.
Transformer 65	7.15c.
Transformer 58	7.65c.
Transformer 52	8.45c.

Silicon strip in coils—Sheet price plus silicon sheet extra width extra plus 25c. per 100 lb. for coils. Pacific ports add 70c. a 100 lb.

CAST IRON WATER PIPE

Per Net Ton

6-in. and larger, del'd Chicago ..	\$54.80
6-in. and larger, del'd New York ..	52.20
6-in. and larger, Birmingham ..	46.00
6-in. and larger f.o.b. dock, San Francisco or Los Angeles or Seattle	56.00

Class "A" and gas pipe, \$3 extra; 4-in. pipe is \$3 a ton above 6-in. Prices shown are for lots of less than 200 tons. For 200 tons and over, 6-in. and larger is \$45 at Birmingham and \$53.80 delivered Chicago.

Progress STIMULATED By

Thomas Strip

COLD ROLLED STRIP STEEL



Thomas cold rolled strip steel is produced by specialists who have pioneered in many phases of cold rolling and pre-coated finishing.

Thomastrip, in many cases, provides product improvement, increased production, and reduced costs. Through special tempers that are suitable, accurate gauges that promote savings, and pre-coated finishes that reduce handling operations, you gain distinct advantages. The steel and finish are matched to your fabricating process as well as the finished part.

Let the Thomas salesman point the way to many new cold strip economies for you.

BRIGHT FINISH UNCOATED

AND ELECTRO COATED WITH

NICKEL, ZINC, COPPER,

BRASS, BRONZE, AND TIN



THE THOMAS STEEL CO.
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL
WARREN, OHIO

PRICES

BOILER TUBES

Seamless Steel and Lap Weld Commercial
Boiler Tubes and Locomotive Tubes.
Minimum Wall.

(Net base prices per 100 ft., f.o.b. Pitts-
burgh, in carload lots)

	Seamless	Lap
	Cold Drawn	Hot Rolled
1 in. o.d. 13 B.W.G.	\$9.01	\$7.82
1 1/4 in. o.d. 13 B.W.G.	10.67	9.26
1 1/2 in. o.d. 13 B.W.G.	11.70	10.23
1 3/4 in. o.d. 13 B.W.G.	13.42	11.64
2 in. o.d. 13 B.W.G.	15.03	13.04
2 1/4 in. o.d. 13 B.W.G.	16.76	14.54
2 1/2 in. o.d. 12 B.W.G.	18.45	16.01
2 3/4 in. o.d. 12 B.W.G.	20.21	17.54
3 in. o.d. 12 B.W.G.	21.42	18.59
3 1/2 in. o.d. 11 B.W.G.	22.48	19.50
4 in. o.d. 10 B.W.G.	23.37	20.62
4 1/2 in. o.d. 10 B.W.G.	25.20	22.66
5 in. o.d. 9 B.W.G.	28.37	24.62
6 in. o.d. 7 B.W.G.	35.20	30.54
8 in. o.d. 5 B.W.G.	43.04	37.35
10 in. o.d. 3 B.W.G.	54.01	46.87
12 in. o.d. 2 B.W.G.	82.93	71.96

Extras for less carload quantities:

40,000 lb. or ft. over.....	Base
30,000 lb. or ft. to 39,999 lb. or ft.	5%
20,000 lb. or ft. to 29,999 lb. or ft.	10%
10,000 lb. or ft. to 19,999 lb. or ft.	20%
5,000 lb. or ft. to 9,999 lb. or ft.	30%
2,000 lb. or ft. to 4,999 lb. or ft.	45%
Under 2,000 lb. or ft.....	65%

STEEL AND WROUGHT IRON PIPE AND TUBING

Welded Pipe

Base Discounts, f.o.b. Pittsburgh District
and Lorain, Ohio, Mills

(F.o.b. Pittsburgh only on wrought iron
pipe)

Base Price=\$200 Per Net Ton

Steel	Black	Galv.
1/8 in.	56	36
1/4 to 3/8 in.	59	42 1/2
1/2 in.	63 1/2	54
3/4 in.	66 1/2	58
1 to 3 in.	68 1/2	60 1/2

Wrought Iron	Black	Galv.
1/4 and 3/8 in.	+9	+30
1/2 in.	24	6 1/2
3/4 in.	30	13
1 and 1 1/4 in.	34	19
1 1/2 in.	38	21 1/2
2 in.	37 1/2	21

Steel	Black	Galv.
2 in.	61	52 1/2
2 1/2 and 3 in.	64	55 1/2
3 1/2 to 6 in.	66	57 1/4
7 and 8 in.	65	55 1/2
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

Wrought Iron	Black	Galv.
2 in.	30 1/2	15
2 1/2 to 3 1/2 in.	31 1/2	17 1/2
4 in.	33 1/2	21
4 1/2 to 8 in.	32 1/2	20
9 to 12 in.	28 1/2	15

Butt weld, extra strong, plain ends

Steel	Black	Galv.
1/8 in.	54 1/2	41 1/2
1/4 to 3/8 in.	56 1/2	45 1/2
1/2 in.	61 1/2	53 1/2
3/4 in.	65 1/2	57 1/2
1 to 3 in.	67	60

Wrought Iron

1/4 and 3/8 in.	+10	+43
1/2 in.	25	9
3/4 in.	31	15
1 to 2 in.	38	22 1/2

Lap weld, extra strong, plain ends

Steel	Black	Galv.
2 in.	59	51 1/2
2 1/2 and 3 in.	63	55 1/2
3 1/2 to 6 in.	66 1/2	59

	Black	Galv.
7 and 8 in.	65 1/2	56
9 and 10 in.	64 1/2	55
11 and 12 in.	63 1/2	54

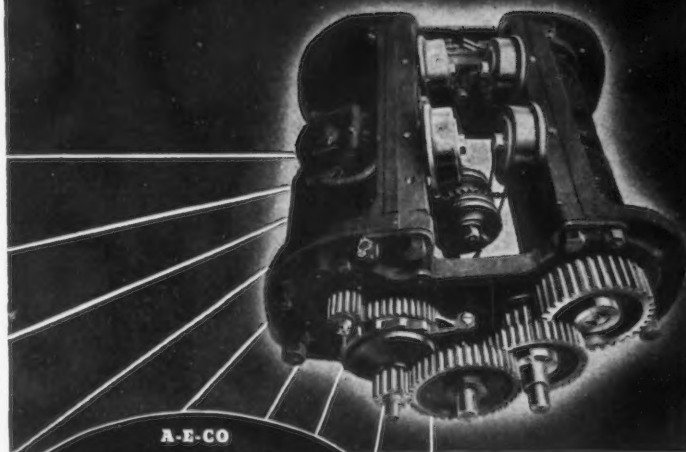
Wrought Iron

2 in.	33 1/2	18 1/2
2 1/2 to 4 in.	39	25 1/2
4 1/2 to 6 in.	37 1/2	24
7 and 8 in.	38 1/2	24 1/2
9 to 12 in.	32	20 1/2

On butt weld and lap weld steel pipe
jobbers are granted a discount of 5%. On
less-than-carload shipments prices are de-
termined by adding 25 and 30% and the
carload freight rate to the base card.

F.o.b. Gary prices are two points lower
discount or \$4 a ton higher than Pitts-
burgh or Lorain on lap weld and one
point lower discount, or \$2 a ton higher,
on all butt weld 8 in. and smaller.

LOOK at its amazing simplicity

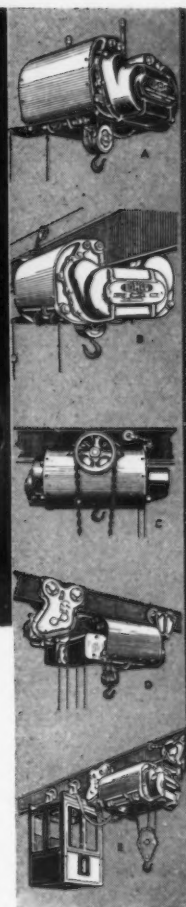


LO-HED Time-tested HOISTS

Every once in a while
you run across a ma-
chine whose logical sim-
plicity makes you fairly
whistle with admiration.

That is the kind of ap-
proval a Lo-Hed Hoist inspires. Motor and drum are sensibly
arranged on opposite sides of the I-beam so that the weight of
one balances the weight of the other; the hook is drawn up
between motor and drum to obtain maximum headroom; and
motor and drum are connected by highly efficient spur gearing.
Take a look at the open-view of the Lo-Hed and we believe
you'll say, "If I'd designed it myself, I couldn't have done better."

• This unique time-tested construction of the Lo-Hed Hoist gives
you low headroom, and an unusually compact, strong and well-
balanced hoist. Remember it also has every worthwhile time-
tested feature a hoist needs: Heavy duty hoist type motor, auto-
matic lowering brake, anti-friction bearings, stub tooth spur
gears, plow-steel cable, 100% positive automatic upper limit stop,
dust and moisture-proof controller. (Construction varies slightly
for classes of Lo-Heds.) Investigate Lo-Hed time-tested construc-
tion. Write today for the complete Lo-Hed Catalog shown below.



THERE'S A LO-HED ELECTRIC HOIST FOR EVERY PURPOSE

- A—Bolt Suspension Type.
 - B—Plain Trolley Type.
 - C—Hand-Geared Type.
 - D—Motor Driven Trolley Type.
 - E—Cab-Controlled Type.
- CAPACITIES FROM
1/4 to 12 TONS



AMERICAN ENGINEERING COMPANY

2410 ARAMINGO AVENUE, PHILADELPHIA, PA.

OTHER A-E-CO PRODUCTS: TAYLOR
STOKERS, MARINE DECK AUXILIA-
RIES, HELE-SHAW FLUID POWER

Look in your classified telephone directory
under "A-E-CO LO-HED HOISTS" for
your nearest representative.

MAIL THIS COUPON NOW



AMERICAN ENGINEERING COMPANY

2410 Aramingo Avenue, Philadelphia, Pa.

☐ Please send me your 26 page complete cata-
log of Lo-Hed Hoists.

☐ Ask your representative to call.

Name

Company

Street Address

City

State

(Please print plainly)

PRICES

ORES

Lake Superior Ores

Delivered Lower Lake Ports

Per Gross Ton

Old range, bessemer, 51.50% ..	\$4.75
Old range, non-bessemer, 51.50% ..	4.60
Mesaba, bessemer, 51.50%	4.60
Mesaba, non-bessemer, 51.50% ..	4.45
High phosphorus, 51.50%	4.35

Foreign Ores*

C.A.f. Philadelphia or Baltimore, Exclusive of Duty

Per Unit

Algerian, low P, Cu free, dry, 55 to 58% Fe	12c.
---	------

Caucasian, washed, 52% Mn	60c.
African, Indian, 44 to 48% Mn	51c.
African, Indian, 49 to 51% Mn	56c.
Brazilian, 46 to 48% Mn	53c.
Cuban, del'd, duty free, 51% Mn ..	72c.

Per Short Ton Unit

Tungsten, Chinese, Wolframite, duty paid, delivered	Nom.
Tungsten, domestic scheelite, delivered	Nom.
Chrome ore, lump c.i.f. Atlantic Seaboard, per gross ton:	
South African (low grade)	Nom.
Rhodesian, 45%	\$23.50
Rhodesian, 48%	27.50

RAILS, TRACK SUPPLIES

F.o.b. Mill

Standard rails, heavier than 60 lb., gross ton	\$10.00
Angle bars, 100 lb.	2.70

F.o.b. Basing Points

Light rails (from billets), gross ton	\$40.00
Light rails (from rail steel), gross ton	39.00

Base per Lb.

Cut spikes	3.00c.
Screw spikes	4.55c.
Tie plates, steel	2.15c.
Tie plates, Pacific Coast	2.30c.
Track bolts, steam railroads ..	4.15c.
Track bolts, discount to jobbers all sizes (per 100 counts) ..	65-5

Basing points, light rails—Pittsburgh, Chicago, Birmingham; spikes and tie plates—Pittsburgh, Chicago, Portsmouth, Ohio, Weirton, W. Va., St. Louis, Kansas City, Minneapqua, Colo., Birmingham and Pacific Coast ports; tie plates alone—Steelton, Pa., Buffalo; spikes alone—Youngstown, Lebanon, Pa., Richmond, Va.

FLUORSPAR

Per Net Ton

Domestic washed gravel, 85-5, f.o.b. Kentucky and Illinois mines, all rail	\$20.00 to \$21.00
Domestic, f.o.b. Ohio River landing barges	\$20.00 to \$21.00
No. 2 lump, 85-5 f.o.b. Kentucky and Illinois mines ..	\$20.50 to 21.00
Foreign, 85% calcium fluoride, not over 5% Si., c.i.f. Atlantic ports, duty paid ..	\$25.00 to \$25.50
Domestic No. 1 ground bulk, 96 to 98%, calcium fluoride, not over 2½% silicon, f.o.b. Illinois and Kentucky mines ..	\$31.00
As above, in bags, f.o.b. same mines	\$32.60

REFRACTORIES

Fire Clay Brick

Per 1000 f.o.b. Works

Super-duty brick, at St. Louis ..	\$60.80
First quality Pennsylvania, Maryland, Kentucky, Missouri and Illinois	47.50
First quality, New Jersey	52.50
Second quality, Pennsylvania, Maryland, Kentucky, Missouri and Illinois	42.75
Second quality, New Jersey	49.00
No. 1 Ohio	39.90
Ground fire clay, per ton	7.10

Silica Brick

Pennsylvania	\$47.50
Chicago District	55.10
Birmingham	47.50
Silica cement, net ton (Eastern) ..	8.55

Chrome Brick

Net per Ton

Standard f.o.b. Baltimore, Plymouth Meeting and Chester ..	\$50.00
Chemically bonded f.o.b. Baltimore, Plymouth Meeting and Chester, Pa.	50.00

Magnesite Brick

Standard f.o.b. Baltimore and Chester	\$72.00
Chemically bonded, f.o.b. Baltimore	61.00

Grain Magnesite

Imported, f.o.b. Baltimore and Chester, Pa. (in sacks)	(—)*
Domestic, f.o.b. Baltimore and Chester in sacks	\$40.00
Domestic, f.o.b. Chewelah, Wash. (in bulk)	22.00

*None available.



DRAVO

DESIGNS AND BUILDS
ORE BRIDGES

● This 12-Ton Ore Bridge, designed and built by DRAVO for the Clairton Plant of the Carnegie-Illinois Steel Company is a 314' span with both ends overhanging the legs, making the total length of trolley track 400 feet. The man trolley, which with its bucket and load of ore weighs about 120 tons, travels at a speed of 900 feet per minute. The entire bridge, weighing more than 800 tons, travels 125 feet per minute and is of the skew type permitting either end to advance 20 to 25 feet ahead of the other. The bucket is lowered and raised with load at an average speed of 225 feet per minute. All controls are fully magnetic and the bridge travel motors are interlocked with automatic spring powered rail clamps.

● Added to its ability to fabricate and erect structures such as the one shown here, Dravo Corporation has had years of experience building docks, retaining walls, plant foundations, everything that enters into the problem of terminal facilities. Inquiries relative to specific problems may be addressed to

DRAVO CORPORATION

ENGINEERING WORKS DIVISION

SHIPYARDS: PITTSBURGH, PA.—WILMINGTON, DEL.

GENERAL OFFICES AND SHOPS: NEVILLE ISLAND—PITTSBURGH, PA.

PRICES

FERROALLOYS

Ferromanganese

F.o.b. New York, Philadelphia, Baltimore, Mobile or New Orleans.

Per Gross Ton

Domestic, 80% (carload).....\$120.00

Spiegeleisen

Per Gross Ton Furnace

Domestic, 19 to 21%.....\$36.00

Domestic, 26 to 28%..... 49.50

Electric Ferrosilicon

Per Gross Ton, Delivered, Lump Size

50% (carload lots, bulk).....\$74.50*

50% (ton lots, packed)..... 87.00*

75% (carload lots, bulk).....135.00*

75% (ton lots, packed).....151.00*

Bessemer Ferrosilicon

Per Gross Ton, F.o.b. Jackson, Ohio

10.00 to 10.50%.....\$33.50

For each additional 0.50% silicon up to 12%, 50c. per ton is added. Above 12% add 75c. per ton.

For each unit of manganese over 2%, \$1 per ton additional.

Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Silvery Iron

Per Gross Ton, F.o.b. Jackson, Ohio

5.00 to 5.50%.....\$27.50

For each additional 0.5% silicon up to 12%, 50c. a ton is added. Above 12% add 75c. a ton.

The lower all-rail delivered price from Jackson or Buffalo is quoted with freight allowed. Base prices at Buffalo are \$1.25 a ton higher than at Jackson.

Manganese, each unit over 2%, \$1 a ton additional. Phosphorus 0.75% or over, \$1 a ton additional.

Ferrochrome

Per Lb. Contained Cr., Delivered Carlots, Lump Size, on Contract

4 to 6% carbon.....11.00c.

2% carbon17.50c.

1% carbon18.50c.

0.10% carbon20.50c.

0.06% carbon21.00c.

Spot prices are ¼c. per lb. of contained chromium higher.

Silico-Manganese

Per Gross Ton, Delivered, Lump Size, Bulk, on Contract

3% carbon\$113.00*

2.50% carbon 118.00*

2% carbon 123.00*

1% carbon 133.00*

Other Ferroalloys

Ferrotungsten, per lb. contained W, del. carload..... \$2.00

Ferrotungsten, 100 lb. and less 2.25

Ferrovanadium, contract, per lb. contained V., del'd \$2.70 to \$2.90†

Ferracolumbium, per lb. contained columbium, f.o.b.

Niagara Falls, N. Y., ton

lots \$2.25†

Ferrocantitanium, 15 to

18% Ti, 7 to 8% C, f.o.b.

furnace, carload and contract, per net ton.....\$142.50

Ferrocantitanium, 17 to 20% Ti, 3 to 5% C, f.o.b. furnace, carload and contract, per net ton.....\$157.50

Ferrophosphorus, electric or blast furnace material, in carloads, f.o.b. Anniston, Ala., for 18%, with \$3 unitage, freight equalized with Rockdale, Tenn., per gross ton \$58.50

Ferrophosphorus, electrolytic 23-26% in carlots, f.o.b. Monsanto (Siglo), Tenn., 24%, per gross ton, \$3 unitage, freight equalized with Nashville \$75.00

Ferromolybdenum, per lb. Mo, f.o.b. furnace 95c.
Calcium molybdate, per lb. Mo, f.o.b. furnace 80c.
Molybdenum oxide briquettes 48-52% Mo, per lb. contained Mo, f.o.b. Langeloth, Pa. 80c.

FUEL OIL

Per Gal.

No. 3, f.o.b. Bayonne, N. J. 4.10c.

No. 6, f.o.b. Bayonne, N. J. 2.98c.

No. 5 Bur. Stds., del'd Chicago. . 3.25c.

No. 6 Bur. Stds., del'd Chicago. . 2.75c.

No. 3 distillate, del'd Cleveland. 5.25c.

No. 4 industrial, del'd Cleveland. 5.00c.

No. 5 industrial, del'd Cleveland. 3.75c.

No. 6 industrial, del'd Cleveland. 3.25c.

THE TOUGHER THE WORK

the more you'll appreciate . . .



SUN HEAVY DUTY LUBRICANTS

Whether it's stamping parts . . . or just keeping the motors running—there's a SUN Heavy Duty Lubricant to meet your lubrication requirements.

Performance reports of large operators are constantly proving the worthwhile savings made possible with SUN H. D. Lubricants because of fewer forced shutdowns and increased hours of productive work.

Let us prove to you how these SUN H. D. Lubricants can help you meet today's production demands.

Write—

SUN OIL COMPANY • Philadelphia, Pa.



PETROLEUM PRODUCTS FOR ALL INDUSTRIES

PRICES

COKE

Per Net Ton

Furnace, f.o.b. Connellsville, prompt	\$4.50 to \$4.75
Foundry, f.o.b. Connellsville, prompt	\$5.25 to 5.50
F'dry, by-product, Chicago....	10.50
F'dry, by-product, New England	12.50
Foundry, by-product, Newark or Jersey City	\$11.30 to \$11.90
F'dry, by-product, Philadelphia	11.13
F'dry, by-product, Cleveland...	11.05
F'dry, by-product, Cincinnati..	10.50
Foundry, Birmingham	7.50
F'dry, by-product, St. Louis	\$10.75 to \$11.00
Foundry, from Birmingham, f.o.b. cars dock Pacific ports.....	\$14.75

BRITISH

British

Per Gross Ton, f.o.b. United Kingdom Ports

Ferromanganese, export. £17 18s.
Tin plate, per base box 32s. to 33s.
Steel bars, open hearth £13 9s.
Beams, open hearth.... £12 2s. 6d.
Channels, open hearth.. £12 2s. 6d.
Angles, open hearth.... £12 2s. 6d.
Black sheets, No. 24 gage £18 17s. 6d. max.*; £18 17s. 6d. min.**
Galvanized sheets, No. 24 gage £19 10s. max.*; £19 10s. min.**

*Empire markets only.

**Other than Empire markets.

PIG IRON (Per Gross Ton)

Prices delivered various consuming points indicated by bold italics

	No. 2 Foundry	Basic	Bessemer	Malleable	Low Phos.
Boston.....	\$24.50	\$24.00	\$25.50	\$25.00	.....
Brooklyn.....	26.50	.....	.....	27.00	.....
Jersey City.....	25.53	25.03	26.53	26.03	.....
Philadelphia.....	24.84	24.34	25.84	25.34	.....
Bethlehem, Pa.....	\$24.00	\$23.50	\$25.00	\$24.50	.....
Everett, Mass.....	24.00	23.50	25.00	24.50	.....
Swedeland, Pa.....	24.00	23.50	25.00	24.50	.....
Steelton, Pa.....	.....	23.50	.....	.....	28.50
Birdsboro, Pa.....	24.00	23.50	25.00	24.50	28.50
Sparrows Point, Md...	24.00	23.50	.....	.....	.....
Erie, Pa.....	23.00	22.50	24.00	23.50	.....
Neville Island, Pa....	23.00	22.50	23.50	23.00	.....
Sharpsville, Pa.....	23.00	22.50	23.50	23.00	.....
Buffalo.....	23.00	22.00	24.00	23.50	28.50
Cincinnati.....	23.44	23.61	.....	24.11	.....
Canton, Ohio.....	24.39	23.89	24.89	24.39	.....
Mansfield, Ohio.....	24.94	24.44	25.44	24.94	.....
St. Louis.....	23.50	23.02	.....	.....	.....
Chicago.....	23.00	22.50	23.50	23.00	.....
Granite City, Ill.....	23.00	22.50	23.50	23.00	.....
Cleveland.....	23.00	22.50	23.50	23.00	.....
Hamilton, Ohio.....	23.00	22.50	.....	23.00	.....
Toledo.....	23.00	22.50	23.50	23.00	.....
Youngstown.....	23.00	22.50	23.50	23.00	.....
Detroit.....	23.00	22.50	23.50	23.00	.....
St. Paul.....	25.63	.....	26.13	25.63	.....
Duluth.....	23.50	.....	24.00	23.50	.....
Birmingham.....	19.38*	18.00	24.00	.....	.....
Los Angeles, San Francisco and Seattle....	27.50	.....	.....	.....	.....
Provo, Utah.....	22.00	.....	.....	.....	.....
Montreal†.....	27.50	27.50	.....	28.00	.....
Toronto†.....	25.50	25.50	.....	26.00	.....

GRAY FORGE

Valley or Pittsburgh fce.....\$22.50

CHARCOAL

Lake Superior fce.....\$27.00
Delivered Chicago 30.34

Base prices are subject to an additional charge for delivery within the switching limits of the respective districts.

*Delivered prices on Southern iron for shipment to Northern points are 38c. a ton below delivered prices from nearest Northern basing point on iron with phosphorus content of 0.70 per cent and over. †On all grades 2.25 per cent silicon and under is base. For each 25 points of silicon over 2.25 per cent an extra of 25c. is charged.

WAREHOUSE PRICES

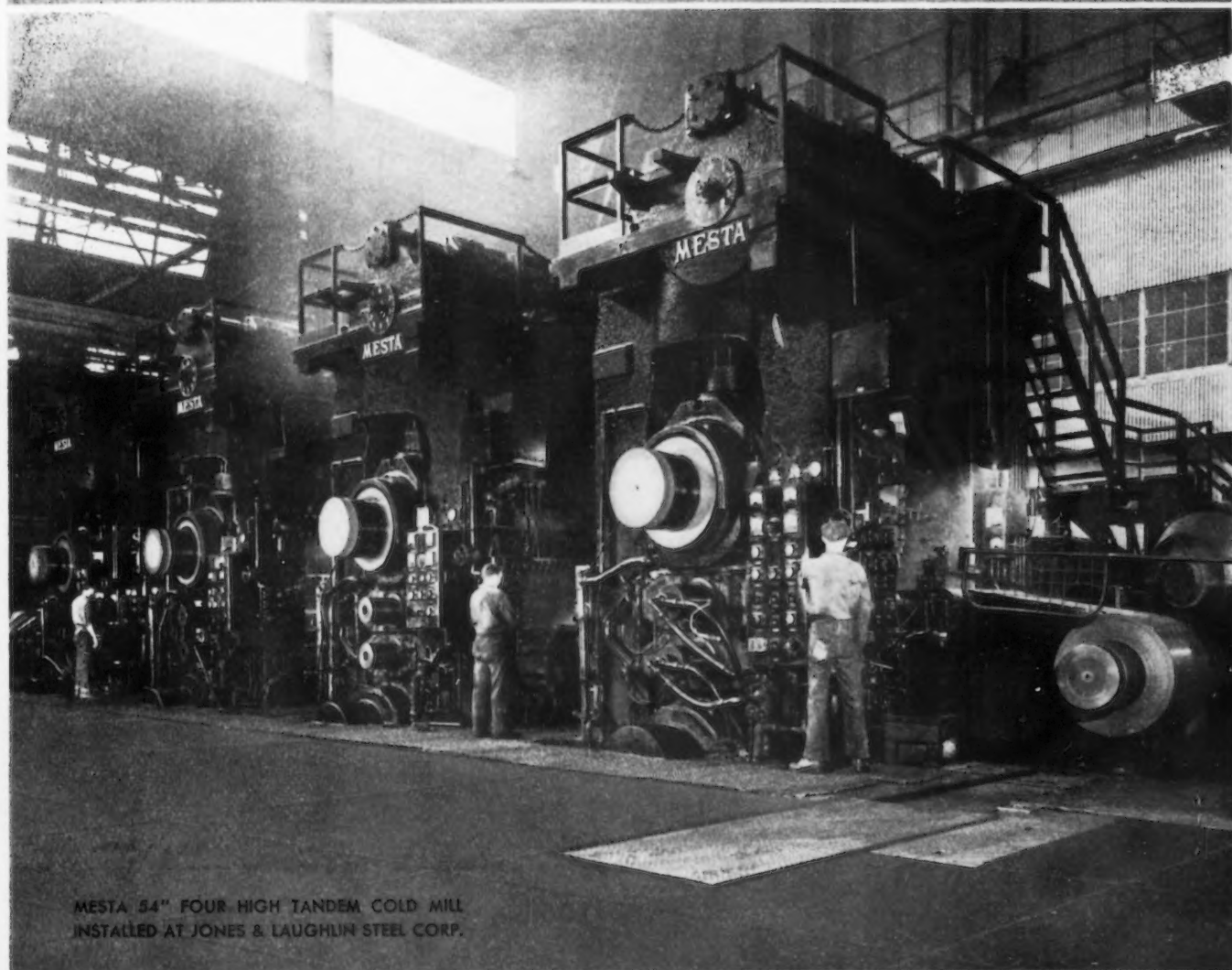
(Base Prices, Dollars per 100 lb., Delivered Metropolitan Areas)

	Pitts- burgh	Chicago	Cleve- land	Phila- delphia	New York	Detroit	Buffalo	Boston	Birm- ingham	St. Louis	St. Paul	Mil- waukee	Los Angeles
Sheets, hot rolled	\$3.15	\$3.05	\$3.15	\$3.35	\$3.38	\$3.23	\$3.05	\$3.51	\$3.45	\$3.18	\$3.30	\$3.48	\$4.30
Sheets, cold rolled.....	.....	4.10	4.05	4.05	4.40	4.30	4.30	4.58	.....	4.12	4.35	4.43	6.50
Sheets, galvanized.....	4.75	4.60	4.42	4.75	4.30	4.64	4.00	4.66	4.75	4.95	4.75	4.98	5.25
Strip, hot rolled.....	3.40	3.40	3.30	3.75	3.76	3.48*	3.62	3.86	3.70	3.52	3.65	3.73	.....
Strip, cold rolled.....	3.20	3.30	3.20	3.31	3.31	3.20	3.22	3.26	.....	3.41	3.83	3.54	.....
Plates.....	3.40	3.55	3.40	3.55	3.76	3.60	3.62	3.85	3.35	3.47	3.80	3.68	4.00
Structural shapes.....	3.40	3.55	3.58	3.55	3.75	3.65	3.40	3.85	3.55	3.47	3.80	3.68	4.00
Bars, hot rolled.....	3.35	3.50	3.25	3.85	3.84	3.43	3.35	3.98	3.50	3.62	3.75	3.63	4.15
Bars, cold finished.....	3.65	3.75	3.75	4.06	4.09	3.80	3.75	4.13	4.43	4.02	4.34	3.88	6.60
Bars, ht. rld. SAE 2300.	7.20	7.10	7.30	7.31	7.35	7.42	7.10	7.50	.....	7.47	7.45	7.33	9.40
Bars, ht. rld. SAE 3100.	5.75	5.65	5.85	5.86	5.90	5.97	5.65	6.05	.....	6.02	6.00	5.88	8.55
Bars, cd. drn. SAE 2300.	8.15	8.15	8.15	8.56	8.59	8.45	8.15	8.63	.....	8.52	8.84	8.88	10.65
Bars, cd. drn. SAE 3100.	6.75	6.75	6.75	7.16	7.19	7.05	6.75	7.23	.....	7.12	7.44	6.98	9.80

BASE QUANTITIES: Hot rolled sheets, cold rolled sheets, hot rolled strip, plates, shapes and hot rolled bars, 400 to 1999 lb.; galvanized sheets, 150 to 1499 lb.; cold rolled strip, extras apply on all quantities; cold finished bars, 1500 lb. and over; SAE bars, 1000 lb. and over. Exceptions: Chicago, galvanized sheets, 500 to 1499 lb.; Philadelphia, galvanized sheets, one to nine bundles, cold rolled sheets, 1000 to 1999 lb.; Detroit, galvanized sheets, 500 to 1499 lb.; Buffalo, cold rolled sheets, 500 to 1500 lb., galvanized sheets, 450 to 1499 lb.; Boston, cold rolled and galvanized sheets, 450 to 3749 lb.; Birmingham, hot rolled sheets, strip and bars, plates and shapes, 400 to 3999 lb., galvanized sheets, 500 to 1499 lb.; St. Louis, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 500 to 1499 lb.; Milwaukee, cold rolled sheets, 400 to 1499 lb., galvanized sheets, 150 to 499 lb.; New York, hot rolled sheets, 0 to 1999 lb., cold rolled sheets, 400 to 1499 lb.; St. Paul, galvanized and cold rolled sheets, any quantity, hot rolled bars, plates, shapes, hot rolled sheets, 400 to 14,999 lb.; Los Angeles, hot rolled sheets, bars, plates, shapes, cold rolled sheets, 300 to 1999 lb., galvanized sheets, 150 to 1049 lb. Extras for size, quality, etc., apply on above quotations. *12 gage and heavier, \$3.23.

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Sales Possibilities

... CONSTRUCTION, PLANT EXPANSION AND EQUIPMENT BUYING

North Atlantic

● **Remington-Rand, Inc.**, Ilion, N. Y., typewriters, office equipment, etc., has let general contract to Charles R. Blackstone Co., Utica, N. Y., for one-story addition, 65 x 140 ft. Cost over \$75,000 with equipment.

● **Bellanca Aircraft Corp.**, New Castle, Del., plans new plant near Yonkers, N. Y., comprising one-story units for parts production and assembling. Division will be established for production of special-type speed boats. Cost close to \$1,000,000 with equipment.

● **Transportation Appliances, Inc.**, 420 Lexington Avenue, New York, manufacturer of oil filters and allied devices, has leased one-story and basement building at 45-22 Thirty-eighth Street, Long Island City, for plant, including parts manufacture and assembling departments.

● **Signal Corps Procurement District**, Army Base, Fifty-eighth Street and First Avenue, Brooklyn, asks bids until Sept. 5 for telephone cable in lots of 50,500 to 202,000 ft., and 46,460 to 303,000 ft. (Circular 72).

● **Standard Oil Co. of New Jersey**, 26 Broadway, New York, has let general contract to Spearin, Preston & Burrows, Inc., 50 Church Street, for two new docks at oil refinery, Linden, N. J., 30 x 575 ft., for handling oil barges, and 30 x 526 ft., for sea-going oil tankers. Also will install new steel storage tank and make improvements in present tank units, and build one-story addition to compressor station. Cost about \$475,000 with equipment.

● **Ericsson Screw Machine Products Co., Inc.**, 25 Lafayette Street, Brooklyn, has engaged Fletcher-Thompson, Inc., 1336 Fairfield Avenue, Bridgeport, Conn., architect and engineer, to prepare plans for new one-story plant, 100 x 160 ft., at Boston Post Road and Richards Avenue, Norwalk, Conn., including boiler house. Bids will be asked on general contract in September. Cost close to \$75,000 with equipment.

● **Commanding Officer**, Ordnance Department, Watervliet Arsenal, Watervliet, N. Y., asks bids until Sept. 4 for 50 to 3500 155-mm. guns (Circular 82); until Sept. 5, 250 to 2700 37-mm. guns (Circular 83).

● **General Electric Co.**, Schenectady, N. Y., has let general contract to M. T. Reed Construction Co., Jackson, Miss., for new one-story plant at Jackson, with main unit, 80 x 800 ft., and adjoining structures, to be used by Lamp Division, Nela Park, Cleveland, for production of electric lamps. Cost close to \$750,000 with equipment.

● **Clarion Chemical Corp.**, 161 Charles Street, New York, industrial chemicals, has purchased one-story building, 50 x 100 ft., at 48-50 Main Street, Newark, N. J., for plant.

● **Aviation & Transport Corp.**, 420 Lexington Avenue, New York, has selected about 25 acres at Williamsport, Pa., for expansion in Lycoming Division at that place, manufacturer of aircraft engines and parts. Additional one-story units will be built, totaling close to 700,000 sq. ft. floor space, for parts manufacture and assembling. Cost about \$1,500,000 with equipment.

● **Callite Products Co.**, 540 Thirty-ninth Street, Union City, N. J., tungsten, copper and alloy products, has acquired former local silk mill of R. & H. Simon Co., on Hudson Boulevard, consisting of group of buildings of 100,000 sq. ft. floor space, for plant, expanding present production. Branch plants at Newark and North Bergen, N. J., will be removed to new location, where operations will be concentrated in future.

● **Pennsylvania Range Boiler Co.**, Twenty-fourth and Washington Street, Philadelphia, has let general contract to Steele, Pownall &

Gebhardt, 1304 Arch Street, for one-story plant, 71 x 200 ft., at Twenty-fifth and Ellsworth Streets. Cost over \$65,000 with equipment.

● **Stoner & Beverage Co.**, Tenth and Hanna Streets, Harrisburg, Pa., has let general contract to Ritter Brothers, 1511 North Cameron Street, for new one and two-story mechanical-bottling, storage and distributing plant, 80 x 100 ft., at Thirteenth and Paxton Streets, with garage unit adjoining. Cost close to \$100,000 with equipment. F. C. Class, Eighteenth and Mulberry Streets, is architect.

● **Quartermaster**, Middletown Air Depot, Middletown, Pa., will make extensions and improvements in buildings and facilities, including equipment. Fund of \$100,000 has been authorized for work.

Buffalo District

● **Union Carbide Co.**, 137 Forty-seventh Street, Niagara Falls, N. Y., has let general contract to Serufari Construction Co., 825 Fifteenth Street, for substructure for one-story addition, 90 x 140 ft. Cost over \$70,000 with equipment.

● **International Business Machines Corp.**, Endicott, N. Y., office calculating and accounting machines, parts, etc., has let general contract to Turner Construction Co., 420 Lexington Avenue, New York, for two-story and basement addition, 140 x 450 ft., for machine shop, tool room and punch press divisions. These divisions will be removed from present buildings, vacated space to be used for expansion in other production departments. Cost over \$400,000 with equipment. Main offices are in New York.

New England

● **Harrington & Richardson Arms Co.**, Worcester, Mass., firearms, has arranged for sale of stock issue of 160,000 shares, considerable part of proceeds to be used for expansion, and additional tools and machinery for general production, special tools for new gun models, engineering and development work.

● **Wallace Barnes Co.**, Bristol, Conn., steel springs, has let general contract to George Lacourse, 55 George Street, for one and two-story addition, for storage and distribution. Cost about \$45,000 with equipment.

● **Commanding Officer**, Ordnance Department, Watertown Arsenal, Watertown, Mass., asks bids until Oct. 7 for 37-mm. gun carriages, in lots of 250 to 1500, with spare parts (Circular 100).

● **Colt's Patent Fire Arms Mfg. Co.**, Hartford, Conn., has taken over four one-story buildings previously used by Pratt & Whitney Division, totaling about 275,000 sq. ft. of floor space, for expansion in machine gun manufacturing department, including parts production and assembling.

● **Hartford, Conn.**, Samuel E. L. Goldman, secretary, mayor's office, will purchase lathes, milling machines, crank shapers, universal and surface grinders for school instruction.

● **Hartford Steel Ball Co.**, 12 Jefferson Avenue, West Hartford, Conn., has awarded contract to Louis W. Slocum, 261 North Main Street, West Hartford, for a factory addition.

Washington District

● **Bureau of Yards and Docks**, Navy Department, Washington, asks bids until Sept. 18 for floating steel drydock, 482 ft. long and 71 ft. beam (Specification 9950); also bids (no closing date stated) for electric overhead traveling bridge cranes for Washington Navy Yard

drydock at South Boston, Mass., Philadelphia and Mare Island yards (Specification 9962); and bids (no closing date stated) for steam-engine-driven electric generator unit, steam receiver, separator and switchgear for power plant at naval hospital, Norfolk, Va. (Specification 10061).

● **Chemical Warfare Service**, Edgewood Arsenal, Edgewood, Md., asks bids until Sept. 9 for three oil-fired boilers, with oil burners, burner accessory apparatus, forced-draft equipment, instruments, piping, etc. (Circular 187).

● **Newport News Shipbuilding & Dry Dock Co.**, Newport News, Va., has let general contract to Dravo Corp., Neville Island, Pittsburgh, for new submerged shipway and shops, for construction of aircraft carriers for Government. Cost about \$1,000,000 with equipment.

● **Bureau of Supplies and Accounts**, Navy Department, Washington, asks bids until Sept. 3 for eight motor-driven horizontal boring, drilling and milling machines, table-type, with auxiliary spindle (Schedule 2757) for South Boston, Brooklyn, Philadelphia and Mare Island yards; portable, power-operated tools (Schedule 2759), composition pipe fittings (Schedule 2767); until Sept. 6, fire pumping engines with hose body and equipment (Schedule 2777) for Eastern and Western yards; motor-driven engine lathes and spare parts (Schedule 2793) for Portsmouth, N. H., and Mare Island yards.

South Atlantic

● **St. Marys Kraft Corp.**, St. Marys, Ga., care of Albert Fendig, Brunswick, Ga., attorney, recently organized with capital of \$1,000,000, plans new pulp and paper mill at St. Marys for production of kraft paper stocks. It will include power house, machine shop and other mechanical structures. Cost over \$650,000 with equipment. Charles Gilman, St. Marys, is one of incorporators.

● **Singer Mfg. Co.**, Pickens, S. C., has let general contract to Daniel Construction Co., Anderson, S. C., for new power house at local woodworking plant. Cost close to \$150,000 with equipment, for which awards are being made separately. Main offices are at Elizabethport, N. J.

● **Barnett Iron Works**, Madison Street, Palatka, Fla., has taken over a one-story warehouse on adjoining site and will improve for machine shop.

South Central

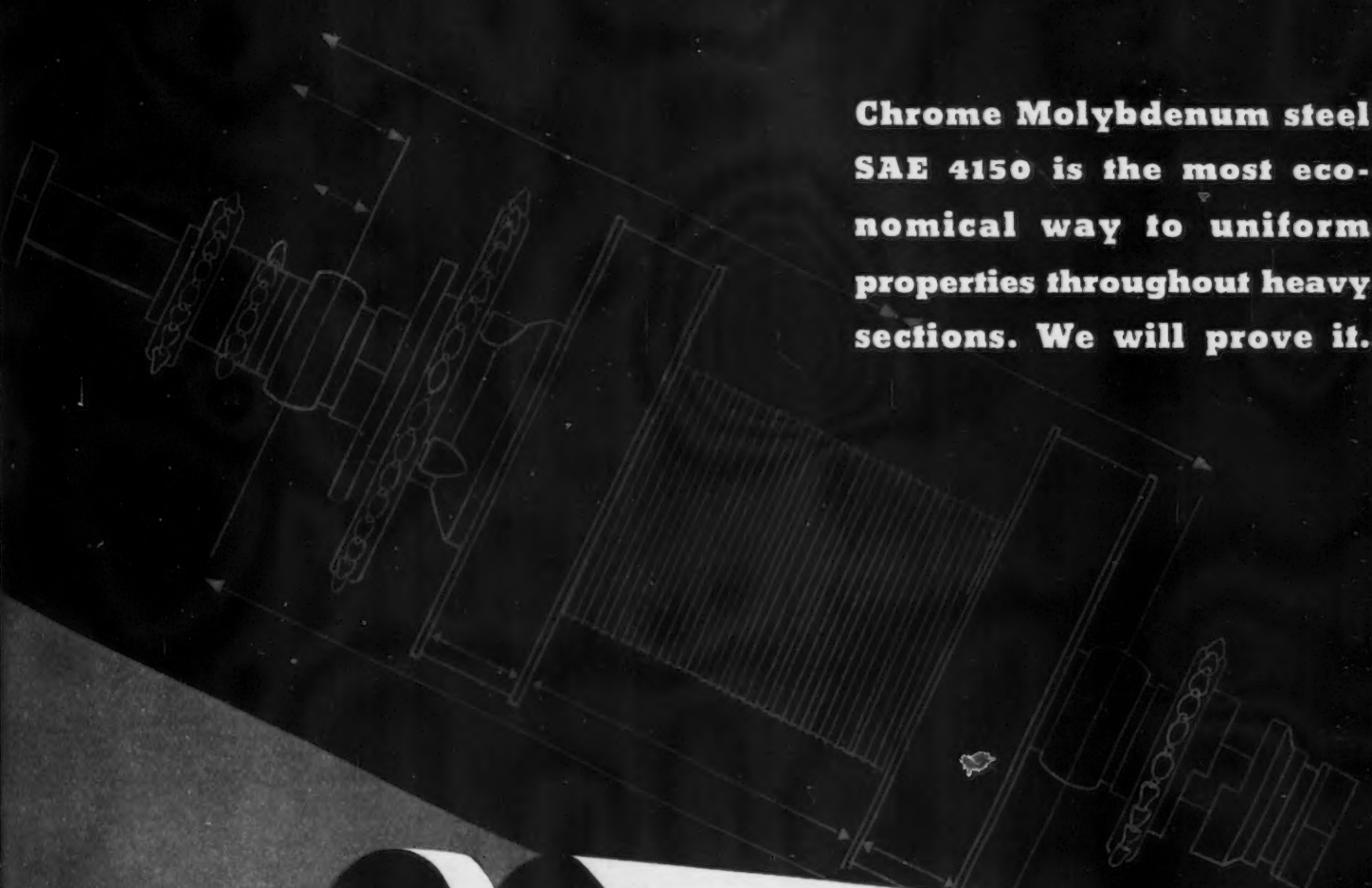
● **Director of Purchases**, Tennessee Valley Authority, Knoxville, Tenn., asks bids until Sept. 3 for one towing winch and accessory equipment for Watts Bar lock.

● **Union Light, Heat & Power Co.**, Covington, Ky., will arrange for sale of securities totaling \$3,176,400, part of proceeds to be used for expansion in power plants and systems, including transmission lines and rural electric lines.

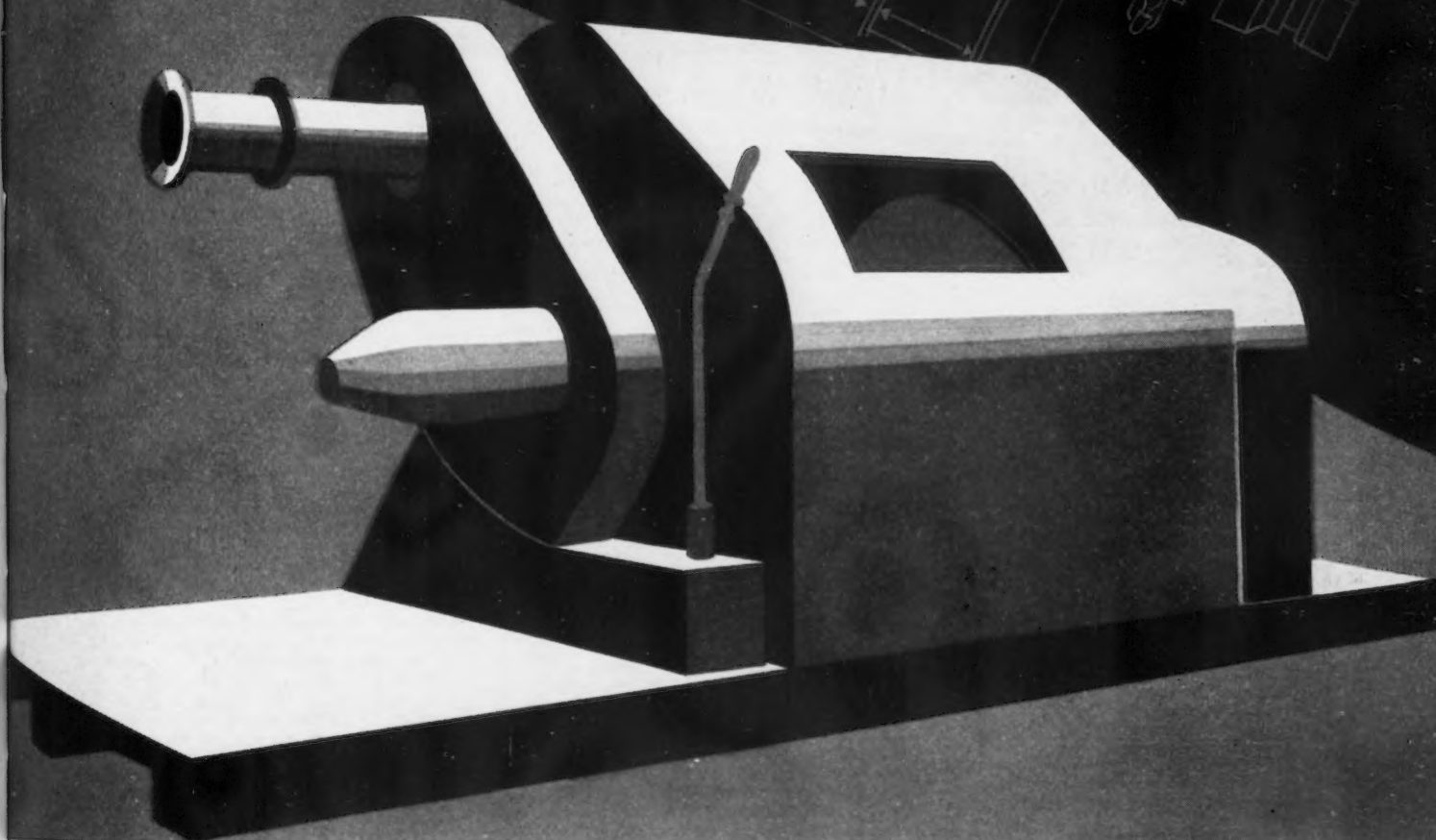
● **Mid-South Packing Co.**, Tupelo, Miss., meat packer, has approved plans for new one-story plant, 80 x 120 ft., with smaller structures for processing, packing, storage and distribution. Cost close to \$50,000 with equipment.

Southwest

● **Chicago, Burlington & Quincy Railroad Co.**, 547 West Jackson Boulevard, Chicago, has let general contract to William Karnopp, 4301½ Main Street, Kansas City, Mo., for new one-story engine shop with shop facilities at North



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MOLEY

Kansas City. Cost about \$50,000 with equipment.

Medart Co., 3500 DeKalb Street, St. Louis, pulleys, gears and other transmission equipment, has let general contract to Fruin-Colnon Contracting Co., 408 Olive Street, for one-story addition. Cost close to \$50,000 with equipment.

City Council, Municipal Building, Oklahoma City, W. E. Quinn, city manager, plans expansion and improvements in municipal airport, including steel hangars, shops, oil and gasoline storage and distribution facilities, and other work. Cost about \$500,000. Financing has been arranged through Federal aid.

Skelly Oil Co., Tulsa, Okla., has approved plans for expansion and improvements in oil refinery at El Dorado, Kan., primarily in gasoline division, with reconditioning of cracking units and new equipment. Cost about \$250,000.

San Antonio Portland Cement Co., West Martin Street, San Antonio, Tex., asks bids until Sept. 4 for two cement silo bins, each 32 ft. in diameter and 70 ft. high, with elevating, conveying and other mechanical equipment. W. E. Simpson Co., Milam Building, is consulting engineer.

Commanding Officer, Ordnance Department, San Antonio Arsenal, San Antonio, Tex., asks bids until Sept. 6 for hexagon nuts, carriage bolts, wood screws, etc. (Circular 6).

Board of Directors, Texas Agricultural and Mechanical College, College Station, Tex., plans new electric power plant, including generating unit, boilers and auxiliary equipment. Cost about \$270,000. Appropriation is being arranged.

Richter's Bakery, Inc., 430 South Laredo Street, San Antonio, Tex., has let general contract to Gilbert Farbo Co., 107 Morales Street, for new one-story baking plant. Cost over \$200,000 with traveling ovens, mixing machinery, conveyors and other mechanical equipment. Charles T. Boelhaue, 512 North Cherry Street, is architect.

Western Pa. District

• **Babcock & Wilcox Tube Co.**, Beaver Falls, Pa., seamless steel pipe and tubing, has approved plans for two one-story additions, 100 x 240 ft., and 125 x 130 ft. Cost over \$125,000 with equipment.

Pittsburgh Plate Glass Co., Paint Division, Grant Building, Pittsburgh, has let general contract to George P. O'Rourke Construction Co., 3915 Center Street, Houston, Tex., for four main buildings for new plant in Burchfield industrial district, comprising four-story unit and three one-story structures. A 100,000-gal. tank will be installed for raw material service. Cost close to \$300,000 with equipment. A. C. Finn, Bankers' Mortgage Building, Houston, is architect.

Ohio and Indiana

• **General Motors Corp.**, Diesel Engine Division, 2160 West 106th Street, Cleveland, has approved plans for two one-story additions for expansion in marine diesel department for Federal orders. Cost over \$250,000 with equipment.

Steel Storage File Co., 2216 West Sixty-third Street, Cleveland, has asked bids on general contract for new one-story plant, 80 x 800 ft., on East Bowman Street, Wooster, Ohio. Cost about \$150,000 with equipment. Present works will be removed to new location and capacity increased.

Sherwin-Williams Co., 101 Prospect Avenue, N. W., Cleveland, paints, varnishes, chemicals, etc., plans one-story chemical-manufacturing plant at Kensington Avenue and 119th Street, Chicago, 300 x 700 ft., supplementing present plant in that city. Cost over \$500,000 with equipment. Albert Kahn, Inc., New Center Building, Detroit, is architect and engineer. Company plans other structures at same location, including power house, one-story storage and distributing building and auxiliary structures. Fund of about \$4,500,000 is being arranged for this and other plant expansion during next 48 to 60 months.

Village Council, North Baltimore, Ohio, has plans for new municipal power plant, 40 x 110 ft. Cost over \$85,000 with equipment. C. J. Simon, Van Wert, Ohio, is consulting engineer.

Board of Public Works, Martinsville, Ind., Edward C. Collier, chairman, plans purchase of stoker equipment for municipal waterworks station.

Lindsay Wire Weaving Co., 14025 Aspinwall Avenue, Cleveland, has awarded contract to James C. F. Shafer Co. for a second two-story addition to its plant.

Michigan District

• **Motor State Products Co.**, Ypsilanti, Mich., auto top frames and tops, etc., has asked bids on general contract for one-story addition. Cost close to \$50,000 with equipment. R. S. Gerganoff, Ypsilanti, is architect.

National Brass Co., Madison Avenue, Grand Rapids, Mich., brass and bronze products, screw machine specialties, etc., plans one-story addition and office structure adjoining. Cost over \$60,000 with equipment. Harry L. Mead, Grand Rapids, is architect.

Briggs Mfg. Co., 11631 Mack Avenue, Detroit, automobile bodies, etc., has begun superstructure for two one-story additions, about 150,000 sq. ft. floor space, adjoining idle building at plant, entire unit to be used for production of metal wings for airplanes and other aircraft equipment. Cost over \$400,000 with equipment.

Saginaw Malleable Iron Division, General Motors Corp., Saginaw, Mich., plans one-story addition to be used for annealing furnace unit and other departments for camshaft production for Chevrolet trucks. Cost over \$100,000 with equipment.

Middle West

• **Goodman Mfg. Co.**, 4834 South Halsted Street, Chicago, electric locomotives and parts, coal-mining machinery, etc., has asked bids on general contract for one-story addition, 125 x 205 ft., for storage and distribution. Cost close to \$100,000 with equipment. Mundie, Jansen, Bourke & Havens, 39 South La Salle Street, are architects.

Deere & Co., Moline, Ill., agricultural implements, has asked bids on general contract for new one-story plant, 120 x 230 ft., Madison, Wis. Cost over \$130,000 with equipment. O. A. Eckerman, first noted address, is company engineer.

John Morrell & Co., Ottumwa, Iowa, meat packers, have let general contract to Stark Building Co., Cedar Rapids, Iowa, for six-story and basement addition, 110 x 120 ft. Cost over \$200,000 with equipment. Henschien, Everts & Crombie, 59 East Van Buren Street, Chicago, are architects and engineers.

Minneapolis-Moline Power Equipment Co., Hopkins, near Minneapolis, agricultural machinery and parts, has asked bids on general contract for one-story addition, to replace two one-story units destroyed by fire several weeks ago. Cost over \$225,000 with equipment.

LeRoi Co., 1706 South Sixty-eighth Street, West Allis, Wis., gas engines and parts, has approved plans for one-story addition, 40 x 170 ft., for storage and distribution. Cost over \$50,000 with equipment. Klug & Smith Co., 111 East Wisconsin Avenue, Milwaukee, is engineer.

Bastian-Blessing Co., 240 East Ontario Street, Chicago, soda fountains, gas apparatus and other equipment, has engaged Fox & Fox, 549 West Randolph Street, architects, to prepare plans for new one and multi-story plant on 13-acre tract at Peterson and Rogers Avenue. Cost over \$450,000 with equipment.

Dayton Rogers Mfr. Co., Minneapolis, is erecting one-story factory for manufacture of metal stampings in small lots. With new and special equipment this additional floor space will practically double present production.

Pacific Coast

• **Douglas Aircraft Corp.**, Santa Monica, Cal., has acquired about 150 acres adjoining mu-

nicipal airport at Long Beach, Cal., for new plant, for which plans will be prepared at once. This is part of general expansion project of company, to include new units at plants at El Segundo and Santa Monica. Entire program will represent investment of close to \$20,000,000. Edward C. and Ellis W. Taylor, 803 West Third Street, Los Angeles, are architects and engineers.

Hancock College of Aeronautics, Santa Maria, Cal., has filed plans for one-story school building, 60 x 170 ft., with machine shop and other mechanical departments, at Santa Maria Airport. Cost over \$45,000 with equipment. R. A. Dolley, Santa Maria, is architect.

Bureau of Supplies and Accounts, Navy Department, Washington, asks bids until Sept. 3 for boat crane machinery and spare parts for Puget Sound Navy Yard, Bremerton, Wash. (Schedule 2756).

Commercial Iron Works Shipyard, foot of S. W. Grover Street, Portland, Ore., plans immediate erection of one-story shop addition, 105 x 180 ft. Cost over \$60,000 with equipment. This is part of general expansion program to be carried out at yard. Bids will be asked soon for additional dock facilities. Verne L. Ketchum, 3144 N. E. Forty-third Street, is engineer.

Philco Oil Co., 2703 South Atlantic Boulevard, Los Angeles, plans rebuilding of part of oil-blending, storage and distributing plant recently destroyed by fire. Loss over \$85,000 with equipment.

Mead, Johnson & Co., 737 Terminal Street, Los Angeles, food products, have let general contract to McNeil Construction Co., 5860 Avalon Boulevard, for new one-story plant, 70 x 164 ft., at 21,100 South Western Avenue. Cost about \$50,000 with equipment. Claud Beelman, Union Bank Building is architect.

General Petroleum Corp., 1710 Sixteenth Street, S. W., Port Angeles, Wash., has approved plans for new bulk storage and distributing plant, including five steel tank units, about 50,000-gal. capacity, and other facilities. Cost close to \$45,000 with equipment.

Canada

• **Coulter Copper & Brass Co., Ltd.**, 115 Sumach Street, Toronto, Ont., plans one-story addition to metal spinning works. Cost about \$50,000 with equipment.

Guelph Stove Co., Ltd., York Street, Guelph, Ont., has let general contract to Bennett-Pratt, Ltd., 30 Bloor Street West, Toronto, for two-story addition, 50 x 125 ft. Cost close to \$75,000 with equipment.

E. S. & A. Robinson (Canada), Ltd., 888 Dupont Street, Toronto, Ont., waxed and other processed paper stocks, plans one-story addition. Cost close to \$80,000 with equipment. Margison & Babcock, 210 Dundas Street West, are engineers.

Northern Elevator Co., Ltd., Grain Exchange Building, Winnipeg, Man., plans new grain elevators. Cost about \$150,000 with elevating, conveying and other mechanical-handling equipment.

J. M. Somerville, secretary, Department of Public Works, Ottawa, has received tenders for an addition to machine shop at H.M.C. dockyards at Halifax, N. S. Cost about \$75,000 with equipment.

Department of Munitions and Supply, Ottawa, Hon. C. D. Howe, minister, has awarded contract to Dominion Construction Corp., 1440 St. Catharine Street West, Montreal, for a munitions plant in Quebec to cost \$10,000,000.

Canadian Vickers, Ltd., 5136 Notre Dame Street East, Montreal, has awarded contract to James Ross, 1010 St. Catharine Street West, for an aircraft plant, 210 x 220 ft., to cost \$190,000.

Imperial Oil, Ltd., 425 St. Christiana Street, Sarnia, Ont., has awarded general contract for crude running and coking plant to Canadian Kellogg Co., Ltd., 660 St. Catharine Street West, Montreal. Cost about \$1,500,000 with equipment.